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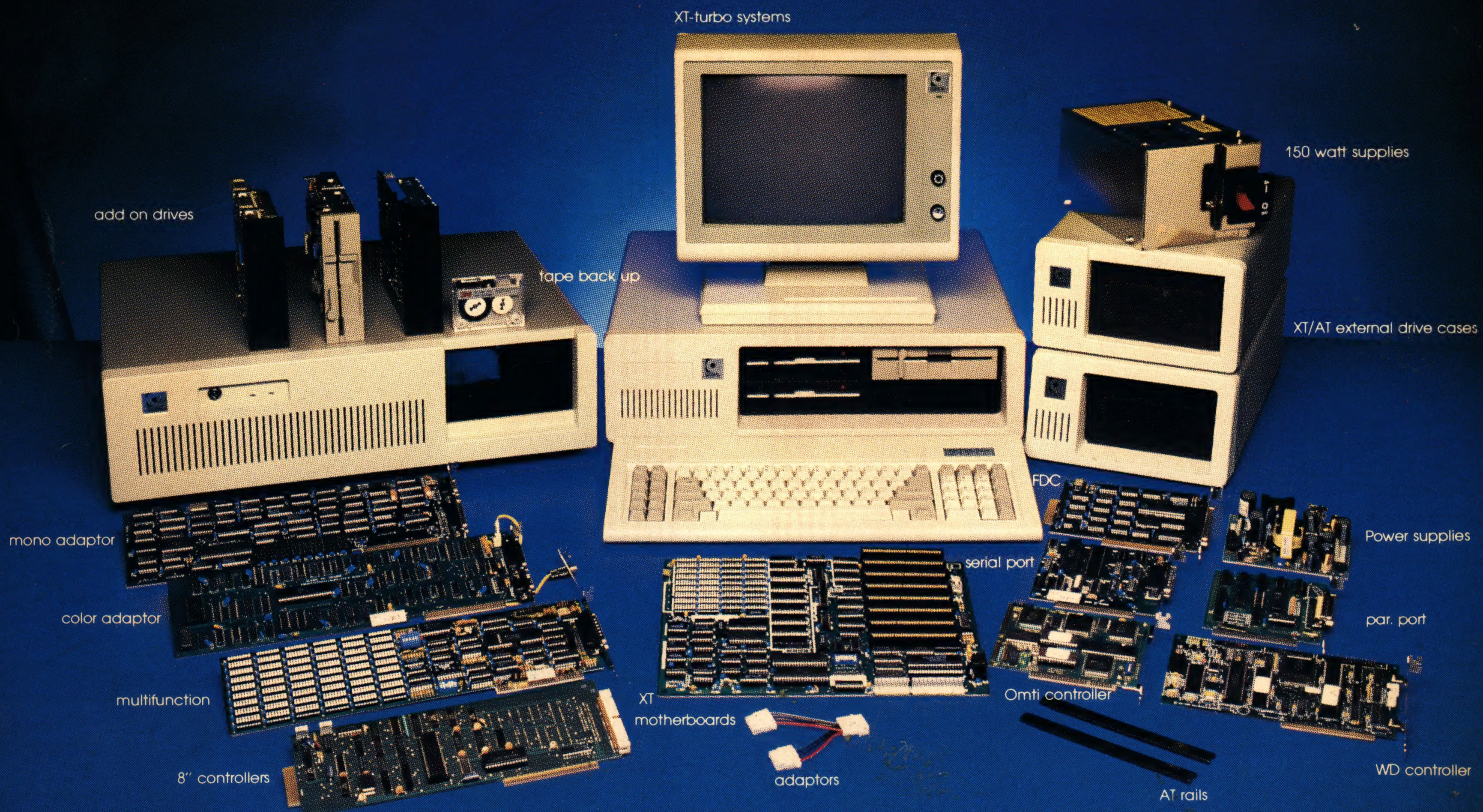
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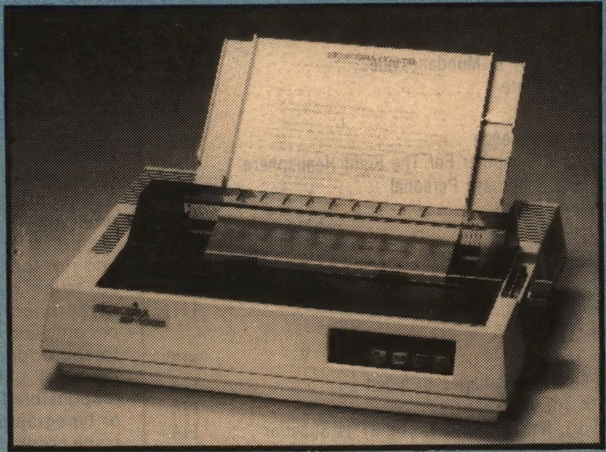

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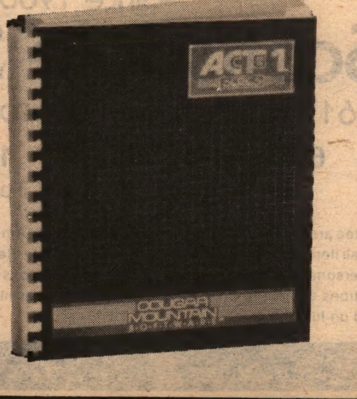

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Hyundai Bets Its Blue Chip On Retail Distribution

by Stan Veit

PC clones from Japan, Taiwan and Hong Kong have been flooding into western markets and turning the PC business into a commodity market. Now Korea is joining the other far eastern manufacturers in the booming American market. Korean manufacturers have been here before, Daewoo makes the Leading Edge and Samsung has been supplying components for some time. Gold Star has been selling monitors and now intends to export computers. However, the boldest Korean manufacturer to enter the Clone Wars is Hyundai Electronics Industries Co. Ltd., manufacturer of the first Korean automobiles to be sold in the United States.

Hyundai is making a full line of PC family clones and peripherals and exporting them to the United States. The American importer is Blue Chip Electronics of Chandler, Az. The unusual thing about the Blue Chip PCs is not their physical, operational characteristics, or even their price, they are quite conventional 8088 XT clones, but the channel of distribution.

Other clones are being sold through mail order distribution, or are being privately labeled and sold through computer stores and value-added resellers. Blue Chip Electronics is selling their Hyundai clones through the mass market distribution channel. The first test marketing was through Target Stores, a division of Dayton-Hudson Stores in the Mid West. In November, Blue Chip Computers will be available at over 500 outlets in the United States being sold by Target, Caldor, Venture Stores, Fedco Stores, The Wiz and SaveMart Stores in N.Y and Wal-Mart. The Blue Chip 8088 PC will be offered at $699 for a compatible PC/XT clone with 512K of RAM, one 360K floppy disk drive, a Centronics printer port, an RS-232C serial port, six expansion slots and a 130 watt power supply. A Hercules-compatible monochrome video board is included. The entire package is attractive with a footprint smaller than the IBM PC.

Blue Chip also offers a second floppy disk drive and both monochrome and RGB color video board and monitors as options. Hard disk options will be available in the first quarter of 1987.

The retail prices average among the low end of the market, comparing favorably with those of the discount mail order outlets. The computer sells for $699, the green monochrome monitor is $89 and the amber is $99. The color video board is $99 and the RGB monitor is $299. An extra floppy disk drive sells for $129 and a memory expansion board is $109.

For those who do not have DOS, Blue Chip sells MSDOS and GWBASIC for $99 including the documentation.

The attraction of the Blue Chip system is that a customer can see the computer operate at the store and take it home with him upon purchase. Most of the outlets have provisions for credit card sales. The introduction of the Blue Chip system competes directly with the discount mail order sellers and will also directly effect Commodore and Atari who have supplied the computers sold in these stores up to now. The Blue Chip brings a 100% PC compatible computer very close to the cost of a Commodore 128, or Atari 520ST with equivalent equipment.

Computer Shopper received a Blue Chip review computer shortly before our editorial staff left for Comdex in Las Vegas. We did not have time for extensive testing, but we found the computer to be well constructed and capable of running any XT software we tried to run on it. We liked the built-in I/O ports which save slots for other expansion. We did not like the monochrome monitor too much but admit that it is better than others we have seen at a higher price. Since we do so much text work we are pills about monochrome monitors.

Computer Shopper interviewed Mr. John Rossi, president of Blue Chip at Comdex, the following is a brief version of that interview:

C S—Mr. Rossi, the choice of retail discount stores as a channel of computer distribution is somewhat unusual for a computer thought of as a "business computer," why did you choose this method?

Rossi—I am a veteran of the Commodore computer wars with Jack Tramiel, being involved in their very successful European operations. Both Commodore and Atari have done very well in this type of distribution and I am familar with the people involved and know what they want in a product.

C S How did Hyundai select a small firm like Blue Chip Electronics as their distributor?

Rossi—We have been distributors of peripherals such as printers, and Commodore type disk drives doing business with Korean firms. We have the experience and the technical and sales staff needed for this type of import business.

C S—Knowing the liberal return policy of the mass market discount stores, how will you keep up with repairs and damaged merchandise?

Rossi—First we intend to "burn-in" every unit before we ship it to the stores, nothing that is defective will be shipped. Second, we will have 22 offices in various parts of the United States and they will handle the repairs. We have different agreements with the retailers depending on their policy. Defective merchandise will be exchanged. After sale, problems under warranty will be taken care of by the stores and our offices. With our QC and burn-in of computers we do not expect too much trouble.

C S What about training the sales people who work for the retailers?

Rossi—We provide a video training tape to the stores and our manuals are excellent. Most of these stores already have been selling Commodore, or Atari computers so they are not completely in-experienced with computers. Frankly, the people working in computer stores these days are not very experienced either!

C S Do you expect to have machines in the stores for the Christmas season?

Rossi—We have been selling in the Target Stores for some time and we hope to have computers in many of the other stores in time for Christmas. We have had no problem with FCC approval as some of the other manufacturers have had. In fact we have had our computers approved as a system while others have had problems with video monitors and other components. ●

At Comdex, Fall 1986, the Blue Chip computer was one of the most popular exhibits as dealers signed up to become Hyundai dealers. The connection with the successful automotive branch of the company was emphasized by the presence of a gleaming red sports model Hyundai automobile. Another attraction at the Blue Chip exhibit was the Blue Chip AT computer which will go on sale during 1987. Many of the retailers and Value-Added Resellers showed interest in this advanced model. No retail price for the AT clone was announced at this time but it will be highly competitive.

Conclusions

We like the Hyundai Blue Chip XT, it is well made and runs all the PC/MSDOS software we tried on it. It appears to be as fast as any other XT.

The price and method of marketing of the Blue Chip XT invites comparison with the Tandy Model 1000 computers. We find that the Blue Chip XT is as good a buy as the Tandy SX1000 and when it comes to value I would even consider it as good as the EX1000 at $799. True the EX1000 give you color at less than $1,000, but the Blue Chip offers expansion slots which the Model 1000 does not. ●

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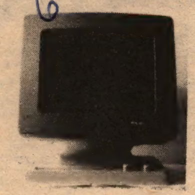

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What's New in 1987: A Look Ahead

by John J. Anderson

Quick 1986, wasn't it? At this pace, the '90s will be upon us by the middle of next week. Yes, the computer industry has had its boom times and its bust times so far this nervous decade, and we make the ironclad prediction that the ups and downs are bound to continue. It is, perhaps, fair to point to a comparative lull in the industry right now, following the breakneck growth pyrotechnics displayed in the early '80s. It has been said that the industry is nearing a technological lull, as well—that much, let us tell you, isn't true.

For while the coming innovations of 1987 may not seem as slack-jawed earth-shattering as those from 1984 or 1981, the fact is that they shall continue relatively unabated, and despite their lack of the capacity to disarm, they shall map the future path of the industry just as the breakthroughs that preceded them. One thing is important to remember: it's not that we lack for surprises nowadays—we're just harder to surprise.

Following is a list of our picks for the 15 most important areas to be watched in 1987. Some will seem obvious, others perhaps less so. You are bound agree with some. You will possibly disagree with more. We're willing to take the risks on the categories we explore ahead. The bets are relatively safe ones.

But there remains an area in which we will happily hedge. It is our expectation, in fact our fond hope, that we have committed at least one big error of omission here—of a breakthrough that comes to us out-of-the-blue (though for sure not out-of-the-Big Blue), unannounced, and with lashing implications. Somewhere out there in the cold hard world of negative cash flow, chapters eleven, and a new tax code hostile to small business, there resides a harried coven of visionaries, sitting on an idea that will change everything once again. Our hope is it will prove that there still are a few surprises left for even the most jaded of us.

Take *Computer Shopper* for example. We've sure surprised a lot of people, and the year is still young!

In a little over a dozen categories, however, the future is somewhat more predictable. If you'd like a glimpse of 1987 right now, read on. You'll be better prepared for the coming year in computing—or at least a bit tougher to surprise.

1. **Laser printers become cheaper and more powerful.** By the end of the year, you'll be able to pick and choose from at least a half a dozen fully-featured laser printers, at prices of less than half of those a year ago. You'll be able to drive them from an AT or a new 386 machine or even an Amiga or Atari ST. They will support a large complement of software and user-definable fonts. Some will function as copy machines as well. Output resolution will top 300 dpi (dots per inch). Aliasing (known colloquially as "the jaggies") will be minimized.

As a direct result, the desktop publishing industry will achieve full blossom. As the publishing industry becomes more and more decentralized, special-interest publishing will flourish. Much of it will be directed toward computers, technology, and desktop publishing itself.

Did someone once predict that the microcomputer industry would put an end to paper communications? Hey, it wasn't us. Every time a laser printer is sold, a tree falls in the forest. And the only sound that it makes is a muffled whimper.

2. **RAM memory price breakthroughs change the way we compute.** Can you remember when plugging in a 64K board was the last word in RAM? A whopping 128K to play with! Now 640K is barely adequate, and the word "Meg" commonly replaces the letter "K" when talking about RAM. With a Meg of RAM installed, once rock-solid barriers begin to drop. Multiple software can reside in memory (discussed ahead) and new packages of greater complexity are possible. By the end of 1987, 4 Meg of RAM will define a pretty fair set up. Needless to say, 16 Meg will be preferable. It will also be faster, require less power, and less space (the one-megabit static column RAM chip will become standard).

What good will this much memory really do? Well, as any Hindu worth his salt will tell you, everything is interconnected, you know. Loads of RAM onboard your system unit makes cheaper laser printing possible, as the whopping overhead to effect satisfactory computer typesetting need not be stuck inside the printer itself (as is the case, for example, with the Apple LaserWriter). Loads of RAM also allows a graphic interface to ride alongside advanced applications without squeezing out power potential. And as discussed up ahead, the graphic user interface shall reign supreme by the end of 1987. Of course, the command line interface shall always be available to those seeking a fix of nostalgia, and/or those who think self-esteem can be built by doing things the hard way.

Most importantly, massive RAM will put an end to the idea of "one machine, one program." RAM-resident programs and desk accessories will put every application you want to run immediately at your fingertips. In addition to sheer addressable RAM, the concept of "virtual" RAM allows the swapping of files from hard disk, to actually exceed the RAM limitations of a given machine. Eventually, the idea of slipping in floppies to start-up new applications will seem as quaint as a slipping in a crank to start your car.

3. **Hard disk price and capacity breakthroughs make them standard equipment.** By the end of the coming year, a computer without a hard disk drive will either be in the kid's room or in the closet. Any computer used for real tasks will be tethered to a reasonably-priced hard drive, featuring from 20 to 80 Meg. The ascendency of the hard disk will finally drive a stake through the heart of the vicious copy-protection cycle (more on that ahead as well).

The hard disk drive will take its rightful place as in indispensable innard to any serious computer system. Floppies will only be used to read in new programs, port data, or back-up files on hard disk. As a result, computers themselves will work faster, more conveniently, and more powerfully.

Hard drives themselves will shrink in size and grow in durability. Hard disks on a card will drop to an irresistable price point. Partitioning systems will be more efficient and easier to use. The drives will form the anchors of LAN systems shared by entire offices.

4. **CD-ROM and WORM drives finally hit retail shelves.** The time of low cost, truly mass storage arrives. Hard disks can be backed up to write-once optical drives in a matter of minutes, where they can be safely stored in a minimum of space. CD-ROM software publishing will help manufacturers get an edge on piracy.

Whether or not erasable optical disks will become a practical reality in 1987 is very chancy to predict. The answer is probably no, at least not at a price point that will do much to the computing industry this year. When in fact this day comes, as it inevitably will, the days of the magnetic hard disk drive (with its delicate demands and eventual wear) may well be numbered.

Until that day comes, we'll make good use of the WORM (write-once, read-mostly) drive, and the prepackaged CD-ROM, which might contain, for example, a telephone directory for the entire nation on just a few shiny circles of plastic-encased aluminum. As nothing but light touches the disk and the information is laser-cut, media will never wear out—though it will still grow outdated.

A word about updates on WORM drives. Although you cannot update a worm file in the way you can change data on a magnetic disk, write-once media can, after a fashion at least, be updated. The process involves rewriting an entire, updated file to a new location, then blowing away the pointer on the original. Not the latest word in efficiency, but it works, and with 550 Meg or so to literally "burn," a little bit of waste is entirely acceptable.

5. **The 386 CPU arrives, bringing with it breakthroughs in processing speed and power.** No need for a crystal ball on this one—a slew of micros based on the Intel 80386 chip made their debut at Comdex. Many of us have grown used to the IBM PC, with its processing speed of under 350,000 instructions per second. Machines built around the 386, with its speed of

continued on page 12

Editorial

By Stan Veit

Comdex Round Up

I have just returned from Comdex, Fall '86 in Las Vegas, the big show of the year for the Personal Computer Industry. In the computer show world the former big show, National Computer Conference (NCC) seems to have just about eliminated PCs from its format and in doing so it shot itself in the foot. PCs are a very important part of the computer industry, removing them from a show does not eliminate them. Since mainframes and minicomputers are no longer as big a business as they used to be there is quite a bit of speculation that it is the NCC that is on the way out, not PCs!

The Consumer Electronics Show (CES) has also just about eliminated computers since the often reported, but never happened, "death of home computers." With Apple having one of its best years, Commodore moving into the black, Tandy selling lots of EX1000 and CoCo Computers, and Atari ST doing great, the so-called "home" computer market is bigger than it ever was in terms of dollars spent. The computer in the home is not used mainly for entertainment. It educates the kids, keeps track of the family business and makes itself generally useful around the house. Isn't that what it was supposed to do? The problem was that the early "home computers" did not have enough power to do anything useful. Now that PC-clones, Amigas, Atari STs Apple IIgs and Macintosh computers are moving into home environments, computers are becoming practical. The manufacturers however, no longer see CES as a place to exhibit because the consumer electronics trade is no longer much of a marketing channel for computers. Most of the other shows have turned into local afairs and Comdex is left as the most important national personal computer show.

Comdex Trends

To me one of the most interesting trends at this year's Comdex was the presence of many oriential manufacturers showing computers and peripherals under their own name. They have been here before but under the nameplate of an American manufacturer or importer. Daewoo of Korea only sold through Leading Edge, Mitsubishi was imported by Sperry, Mitec and MultiTech sold under many names by mail order vendors. Now this phase is past and the Far Eastern computers are in the marketplace under their own names. In this issue we have an article on Hyundai one of the largest industrial companies in Korea. Daewoo, Sansung and Tatung are also in the clone business as well as Mitsubishi, Mitec and Multitech to say nothing of the Japanese names of Sony, Sanyo, Panasonic and Fujitsui who we already know. All of these are big industrial firms and they are after a bigger slice of the American market. Who will they displace to get that share? The first candidates are the small firms in Taiwan. Hong Kong and Japan who make the cheap clones that are sold as kits or parts. This process is being assisted by the American DOS makers. For example, Microsoft has complained that pirated versions of their software are coming into this country. The only legal Microsoft licenses from Taiwan, for example are Mitec and Multitech. The US Customs will soon really crack down on violators of US copyrights and patents for PCs just as they did with bogus Apples.

Once the little firms exporting to the US are finished, the big, oriental manufacturers will try to displace U.S firms in our own market. They will go after Compaq and IBM for example. Daewoo has already bought most of Cordata according to our latest intelligence. If you think the elimination of major US computer companies is impossible, ask yourself how many television sets are made in the US, or how many Hi-Fi Sets. These are also industries we developed and then exported to the Far East.

Another phenomenon at Comdex revolved around the booth of a well known manufacturer of computers. No it wasn't IBM, or even Compaq, it was the Atari! This was easily the most crowded exhibit at the show, you could hardly get into it. Believe it or not they were showing last year's models of the ST. The next generation was being shown only to selected visitors in their suite at the Hilton Hotel.

Meanwhile, back on the show floor the crowds were looking at ST computers running business software, databases, word processors, spreadsheets and communication programs. Desk Top Publishing and Music programs were also featured. The slogan of Atari's booth was "ATARI MEANS BUSINESS."

I don't know if they managed to translate the crowds into orders for ST computers but if only a fraction of the viewers decided to carry Atari it would indicate a large increase in the amount of stores carrying the ST line. Remember, the people who attend Fall Comdex are retailers and owners of systems houses (VARS), they are a pretty blase lot and not given to getting excited about any computer system. For them to crowd into a booth that is not in the mainstream of the PC world is unusual, in this case it is a near miracle. Just last year these same computer store owners, mail order dealers and systems house owners were loud in their statements that: "We wouldn't touch Atari with a ten foot pole!" During the past year the Atari ST has gained remarkable software support and even more, better massive user support. It is outselling the Amiga and perhaps the Macintosh (except in business organizations). There are secret nests of ST users in art departments in major companies, just the way microcomputers were brought into accounting departments a few years ago. They are picking the Atari ST because of the price and extensive software support. If the reaction of the dealers at Comdex is any indication of success (and I believe it was) we are going to see Atari ST computers and software in many more stores during 1987.

We published an article "The Myth of Atari Superiority," and this created a lot of controversy, which was exactly what was intended. I still don't know which is "superior" but I do know that Atari runs rings around Commodore when it comes to getting software support and publicity. Commodore did not exhibit at Comdex in Las Vegas and I feel that was a major blunder. There are only three major alternatives to MSDOS, these are Atari, Commodore and Apple, the only one to show up at Comdex was Atari and they got all the glory.

Mass-Market Computer Retailers

There is a new type of computer dealer staking a place in the marketplace, the mass marketing discount operator. The K-Marts, Toys-R-Us, Wal-Marts, Caldor, Federated Stores, and Target Stores are selling PC-clones and they will become a big success for two reasons. First they offer a liberal return policy and they take credit cards, while making immediate delivery. A man goes shopping with his wife and while she tries on fashions, he hangs out at the computer counter where a demo of the PC-clone is on display, actively running software. Bet your bottom dollar that sooner or later he is going to buy the Hyundai or other PC-clone.

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What is going to happen to Computer Stores in the face of this competition? I think they will drop the lower priced PC-clones just as they dropped Atari and Commodore when the mass marketers took them over. In place of the lower priced PC/XT clones they will sell the ATs and future 80386-based computers. I also do not think that the mail order dealers will suffer because they will either undercut the stores, or sell only the higher-priced upgrades, or both. The entrance of many new customers into the market by buying a first computer at the local discount store will only enlarge the customer base for the mail order vendor. The new computer user will soon learn that the selection at the local store is very limited and will discover *Computer Shopper* and its vast array of bargains. ●

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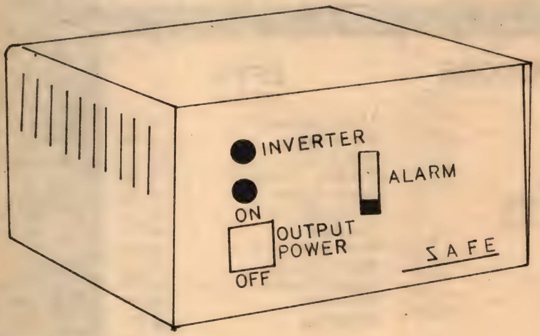

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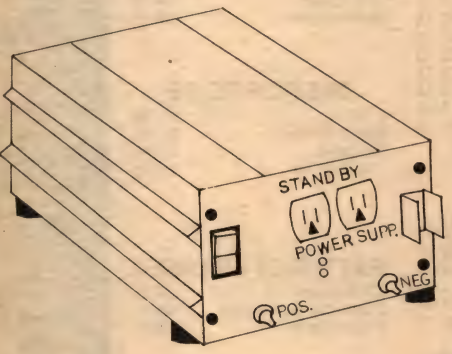

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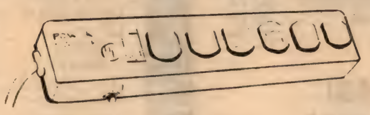

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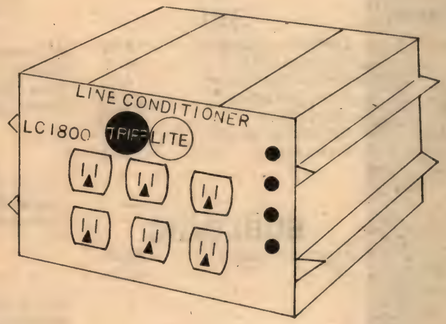

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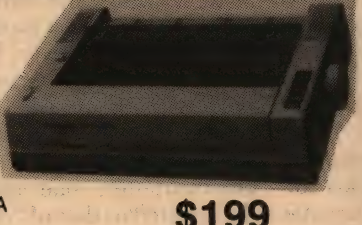

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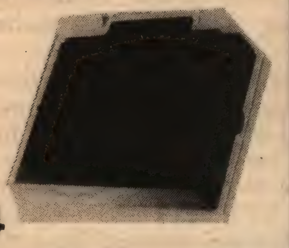

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What's New

continued from page 7

4,000,000 instructions per second, should post somewhat of an improvement. The 80386 is a true 32-bit processor, and has the potential of finally defeating its latest generation archrival, the 68020. The battle of the sixes and eights will not end in 1987, but we will probably get a very good indication of whether Motorola can really last in the ongoing war of attrition.

By the end of the year, the IBM PC will be an antique, unless turbo-enhanced. The XT will be seen on desks in the mailroom and reception, and 286 upgrade boards at new lower prices will sell very well. The AT (or AT clone, needless to say) will be the workhorse, in the position of the PC in 1983 or XT in 1985. And the brass, gurus and power-users will sport 386 machines on their desks.

The 386 of course retains compatibility with the 80286 and 8088 that came before it—so existing software packages designed for earlier IBM-compatible incarnations can still be run.

By the way, the Intel 80386 processor can directly address up to four gigabytes (4000 Meg) of RAM. Is that enough for your needs?

Yes, the 386 has its naysayers, and some of their points are well-taken. The fact is that until new, powerful software packages become available, the 386 only means increased speed. But it will take its place in the scheme of things nonetheless.

6. **The graphic-based system gains ascendency.** By graphic-based we mean a bit-mapped screen, with a peripheral such as a mouse, tablet, or trackball, controlling a corresponding pointer on the screen (though you will always be able to use the keyboard if you so desire). Also on that screen are pull-down menus, dialog boxes, and windows, wherein a bit-mapped approach is taken to display. Devotees of the command line interface (sometimes referred to as "Clingers") may find this a painful, or even idiotic, direction for computing to take. Our prediction is, despite these folks, the graphic interface will spill over from the sixes to the eights in a big way this year. Even more painful to IBM loyalists is the fact that this contribution is Apple's legacy.

But the fact is that the advent of the laser printer makes it imperative that what you see on the screen match the hard copy you create. (It is, however, agreed by everyone but comedian Flip Wilson that one of the least fortunate acronyms in computing is WYSIWYG (pronounced "whizzy-wig," for "what you see is what you get.") Advances in display resolution have set the foundations for the graphic interface, and lower prices for RAM, as stated earlier, have cemented the rest of the structure into place. The coming proliferation of laser printers will finish the transformation.

With the 286 chip an established workhorse and the 386 coming on fast, Intel processors can now handle the overhead of a graphic interface without a sacrifice of programming power—a valid complaint we've heard for some time from Clingers comparing Apples and Blueberries. As stated above, the command line interface will probably never be abandoned entirely, and those who would rather commit brain "wetware" to mundane tasks which should really belong to the computer, will still have the opportunity to waste valuable time in that manner. The rest of us, however, 386 chip or no, will join the ranks of, well, as Apple once put it, "the Rest of Us."

7. **Networks promote multi-user access/sharing of computing power.** The idea of "one-computer, one user" becomes as antiquated as that of "one-computer, one program," as discussed in prediction 2. The LAN, or local area network, will reach a price point where many who have been "holding out" will finally commit to a system wherein the micros in their offices can share data, hard disks, and laser printers.

In cases where network connection is not feasible or impractical, advances in telecommunications will fill in. Wireless modems will transmit data through the airwaves rather than over telephone lines to computers within the 25 mile antenna range of a VHF FM channel. Plummeting modem prices will make speeds of 9600 baud economical. And direct satellite transmission will connect computers worldwide.

One important stride which will not be made in 1987 but should occur soon after is that of ISDN (for Integrated Services Digital Network). This concept obsoletes the conversion of digital computer data to analog form for transmission over existing telephone lines, in favor of redundant, unmodulated, direct digital transmission. Imagine—never again a noisy line, and you can use your modem as a doorstop!

Did someone once predict that telecommuting would revolutionize American society? That might have been us, folks. Well ISDN might give that a big push someday soon, despite our long-term experiment in divestiture and the high cost of reliable data transmission.

8. **Practical artificial intelligence programs emerge.** We're not here to get involved in a debate as to whether computers can really think. How you feel about that question has more to do with what you think it means to be human than what you know about the capabilities of machines. Here, luckily, we are talking about the increased capabilities of machines.

The advent of cheap memory and more powerful processing makes much

continued on page 18

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Everex Edge	219
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Atari 1027	119
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520 ST B & W System	629

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Hayes 1200B No Smartcom	298
Hayes 1200B w/Smartcom 2	328
Hayes 300	124
Hayes 2400	559
Hayes 2400B w/Smartcom	499
Hayes 2400B No Smartcom	459
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Promethias 1200 External	249
Promethias 1200 Internal	149
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Hayes Smartcom 2	79

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310 Amber	139
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Color 722	454
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Princeton HX12E	469
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K-139 AT/XT Keyboard Large Return Key, 12 Function Key, Enhanced Keyboard	$69
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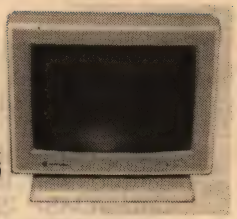

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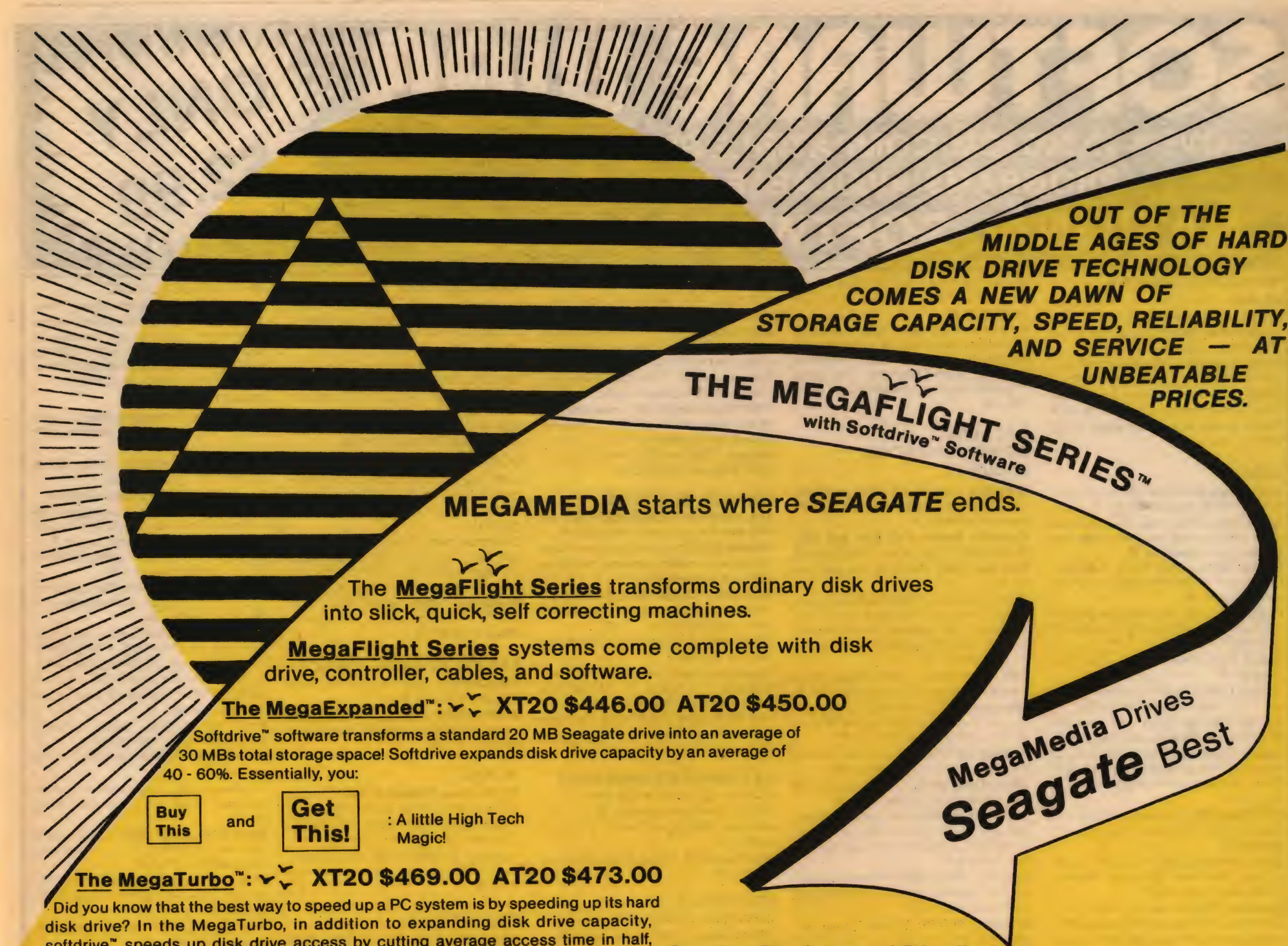

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WORD PROCESSORS

PC-Write (115-116) (two disks) with spelling checker version 2.7. **U**

Letter Writer (103) Program makes letter writing a snap. **P**

Patch Locations for WordStar (105) Customize WordStar startup defaults. **P**

Omni (106) Fast memory editor with integrated communications software. **P**

Turbo Script Word Processor (117) with on-line help. **N**

GAMES

JetSet Flight Simulator (201) Turn your PC into the pilot's cockpit. **P**

Space War (203) This disk also has other BASIC programs. (Requires hercules or color graphics) **P**

Arcade Games (204) Kong, Pac-Man, Pango, and Bricks (Requires color graphics adapter) **P**

FlightMare (212) Be a fighter pilot in the future. (Requires color graphics adapter) **P**

Galaxy Trek (214) Great Star Trek type program. **P**

Trucker (215) Drive an 18-wheeler from LA to NY. Watch out for Smokie! **P**

3-D Tic-Tac-Toe (216) Also includes Bridge, Keno, Roulette, and Othello. **P**

Insults/Eliza Insults (223) Generates insults for the unsuspecting user, and Eliza: the famous AI therapist demo program. **P**

PC-Chess (232) Four levels of play with many options (Requires color graphics adapter) **P**

Basic Games (233) Pac-man, Lunar Lander, Star Trek, Jailbreak, Meteor, Fence, and Breakout. **P**

NewTrek (235) 3 levels of difficulty. Battle the Klingons and Romulans. **P**

Centipede (247) Just like the arcade game. (Color/graphics monitor adapter required.) **N**

Sub Chase (248) Bomb the subs! **N**

Archery (249) This game is tough since the targets move. **N**

Monopoly with graphics. (250) Works both with color/monochrome. **N**

Global Thermal Nuclear War. (251) Works with monochrome or a color monitor. **N**

Striker (252) Shoot the enemy targets with your helicopter, like Defender (Requires color graphics) **N**

Battlezone and Nitefire (253) Both are tank games. Battlezone is a 3-D tank game. (Requires color graphics) **N**

More Monochrome Games (254) Battleship: Just like the popular board game. Also has a full-screen backgammon game. **N**

Dungeons and Dragons (255) Let the computer be your dungeon master. **N**

Round 42 (256) Better than space invaders. (Requires color graphics adapter) **N**

Beast and Empires (257) Both of these games will work with a monochrome display. Beast is an arcade-style game. Empires is an adventure type game (Empires requires GWBASIC or BASICA.) **N**

HACKERS/ COMMUNICATIONS/ SECURITY

Q-Modem Version 2.3. (302 and 326) (two disks) Fast and powerful communications software. **U**

Procomm Version 2.42 (308 and 327) (two disks) Communications software. **U**

Guardian (324) Create a host computer. **N**

WWIV 3.2 (325) BBS software supports color, XModem/YModem batch file transfers and includes Turbo Pascal source code. (Requires Turbo Pascal 3.0 to compile.) **N**

8088 Disassembler (401) Disassemble compiled programs for quick patches. **P**

Unprotect (402) This disk gives you tips on making backup copies of protected commercial programs. **P**

Bombsquad (412) This utility checks for the dreaded Trojan Horse. **N**

CHK4BOMB (413) This program will also check for a Trojan Horse. **N**

Unprotect III (414) This disk gives you tips on unprotecting software protected with the SoftGuard copy protection scheme. **N**

COPYPC (415) Better than diskcopy for recovering data from disks that have bad sectors. **N**

Unprotect IV (416) This disk gives you more tips. **N**

PC-Code (417) This disk has an analysis program to check codes; a program to encode data and another to test that a file has not been altered. **N**

PSWD14 (418) This program allows you to add password protection to your hard disk to keep out the casual user. **N**

SPREADSHEETS

PC-Calc (501) Spreadsheet can have up to 26 columns and 255 rows. **P**

LOTUS UTILITIES

Lotus Macros (606) (Requires Lotus 1-2-3) **P**

Lotus Spreadsheet Templates (607) (Requires Lotus 1-2-3) **P**

GRAPHICS

KeyDraw C.A.D. System (703 and 704) (two disks) (Requires color graphics adapter). **P**

PC-Graph (705) Create plots from PC-File data files. (Requires color graphics) **P**

Digi-Draw (708) Program emulates paper and pencil drawing on your PC. (Requires color graphics) **P**

Sideways (709) Print Text sideways. (Requires color graphics adapter) **P**

3-D (719) Allows you to create, edit and save 3 dimensional objects. (Requires color graphics adapter) **P**

Stripper (725) Adults only! (Requires color graphics adapter.) **N**

FINANCE/BUSINESS

The Portworth Package (801) Monitor and evaluate your stock portfolio. **P**

Finance (802) Determines present and compound values; performs mortgage loan and bond analyses. **P**

PC-General Ledger (803) Written by a financial executive with more than 25 years experience. **P**

Mr. Bill (811-812) (two disks) Helps you bill your clients. **P**

Stock Charting System (819) Helps you to create and output volume high/low close charts for stocks you choose. **P**

The Diversified Accounting Package (829) with dBASE III source (Requires dBASE III) Has many functions. **N**

DATABASE MANAGEMENT

PC-File III Version 4.0 (901) User friendly data base manager. **P**

Inventory (911) Parts inventory control system. **P**

NewBase (919) Menu driven database system. **P**

STATISTICS

EpiStat (1001) Statistical Package. **P**

PC-Professor (1102) BASIC tutor. **P**

BASIC Program Generator (1103) Answer the questions and this will create a database management system for you in BASICA. **P**

PASCAL

MicroSoft Pascal Utilities (1216) This disk has a useful assortment of Pascal utilities along with source for various functions. These programs require the Microsoft Pascal compiler, version 3.13. **N**

ASSEMBLY LANGUAGE

Chasm (1501) Cheap assembler. **P**

LANGUAGES/ MISCELLANEOUS

FLOWCHARTER (1608) Designed to provide a programmer with the capability to easily produce flowcharts using simple commands which can then be dumped to a dot matrix printer. **N**

APPLICATIONS

TalkAdd.bas (1710) Make your PC talk with BASIC source. (Requires IBM PC and BASICA or 100% compatible and GW-BASIC) **N**

SurveySoft (1711) A series of programs for the surveyor including modules for field traversal, entry and storage of coordinates and more. **N**

Mail Master (1712) A computer program to handle mailing lists. **N**

DOS

DOS Help (1901) Disk based DOS help. **P**

DOS-a-matic version 2.06 (1903) Menu driven program makes using DOS a cinch. **U**

C-Format (1905) This program is about one third faster than the DOS format; will also allow you to efficiently use both drives when formatting. **N**

FastCopy (1906) Faster than DISKCOPY. Also has Jaws, a loan amortization program. **N**

ARTIFICIAL INTELLIGENCE

ESIE (2001) Explore the futuristic world of expert systems. **P**

dAnimal (2003) Animal guessing game written in dBASE II (Requires dBASE II version 2.41) **N**

MUSIC

PC-Musician Version 1.7 (2401) Develop and play back songs on your PC. **P**

Piano Man (2402) Record edit and then play back your favorite tunes. **P**

Jukebox (2403) Forget the quarters. Just pick the tune you would like to hear. **N**

EDUCATIONAL

PC-Touch (2502) Typing tutor compiled with BASIC source. **P**

Mathpak (2506) Math tutor includes instructions on addition, hex/octal conversions, trig functions and more. **P**

Quest.BAS (2507) Learn about American history while playing an adventure type game. (Runs on IBM PC only, with IBM advanced BASIC) **P**

Funnels and Buckets (2517) This game makes learning basic math skills fun. **P**

IQ Builder (2520) If you think you're so smart, try this one! **N**

SCREEN EDITORS

Text 123.EXE (2706) Text editor/print utility with "Lotus-style" command line and functions. **N**

SED Version 1.0 (2707) This versatile screen editor performs all of the usual editing functions, in addition, it can edit non-text files including pointer files, executable object files, etc. **N**

TEXT PROCESSING

AUTOSYM/MAKESYM (2809) This powerful system allows the user to design and insert special symbols in documents prepared with popular word processors. Requires DOS 2.xx or higher and an Epson FX printer. **N**

UTILITIES

Epson Printer Utilities (2902) Compress, emphasize, etc. Also has SP print spooler. **P**

Public Domain Banner (2912) Makes banners on any printer. **N**

Gemini-10X Printer Utilities (2913) **N**

QWIKML.EXE (2914) This program has no docs, but if you are willing to experiment, it's a dynamite label maker. This disk also has a solitaire game written in BASIC called Klondyke. **N**

Scan (3105) With Turbo Pascal source code. This program is comparable to Norton's Disktest. **N**

Archive (3106) Back up your hard disk. This disk also has SST, a disk optimizer, and SuperDOS, a hard disk directory management program. **N**

ARCCAT (3107) Organize your floppy disk archives. **N**

Hard Disk Utilities (3201) Includes CED, POP alarm, and Partner 1.1. **P**

Desk Team v 1.04 (3203) Sidekick like program. **P**

Telefone (3206) Keep those important numbers organized! (Must have modem) **N**

Batch File Tutorial (3301) Learn how to use the powerful batch processing capabilities of DOS. **P**

Disk Alignment (3402) Helps qualified service personnel perform alignments on disk drives. **P**

Free Copy (3405) Copies disks with source code. **P**

Turbo Cursor (3434) This utility makes your cursor zoom! **N**

Acefile (3435) Yet another Sweep utility. **N**

List591.Com (3436) Awesome file listing utility. **N**

Miscellaneous Utilities with Manx C/Assembler Source (3437) Includes utilities to copy/move files, perform CRCs, preview files, and more. **N**

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**What's New
continued from page 12**

more complex programming possible, as touched upon above. "Expert systems," now the biggest buzzword in the AI community, offer the first practical entry of these sorts of programs into the commercial domain. An expert system applies a set of advanced rules to draw inductive and deductive conclusions bearing upon a specific set of conditions. Even chess-playing programs can be thought of as expert systems: they accomplish something that would be thought of as intelligent if accomplished by a human, though arrived upon by radically different methods than those of human thought.

One of the stumbling blocks of expert systems is the complex and customized nature of its programming. The rules must be right, needless to say, in order for the conclusions to be right, and that represents a massive effort for even the most modest of expert systems. It is also an intensely memory-hungry application type.

Any model must be at once "finished," and at the same time flexible enough to grow and be modified. Another problem of expert systems is that the user is hard-pressed to know when in fact he has been "understood" by the model he is querying. Despite these problems, however, expert systems will lay claim to the upper echelons of computer software in 1987.

9. **Voice recognition makes strides.** This is a subset of AI that will make steadier progress in 1987. A natural language front-end will appear on a growing number of packages, requiring only typed English input rather than cryptic command codes.

While the Dictation typewriter is not on the agenda for 1987, computers will better understand spoken speech as well, in growing sets of vocabulary. We somehow doubt the practicality of a voice-input DOS shell, but you'll be able to have one in 1987, if you're willing to pay the price. "Open the directory, please, HAL..."

10. **More powerful portables emerge.** Did somebody once say that 1986 would be the "year of the laptop?" Don't look at me. And 1987 won't be the year of the laptop, either. It will, however, be a year for technological advances in portable computing. Miniaturized memory, miniaturized hard disk drives, and advanced display technology will bring us these gifts. Many will choose portable machines to round out the computerization of their businesses, as the decision will no longer trade off power for pounds.

11. **New Microsoft DOS establishes 286-386 standard.** No computer can go anyplace without an operating system. The Gospel according to Blue: In the beginning (1981) there was MS-DOS 1.0, and it was, well, okay. That begat version 1.1, which supported double-sided floppies. That begat version 2.0, which supported hard disks and allowed multiple directories. That begat version 2.1, which supported half-height floppies alongside a hard disk. That begat version 3.0, which supported high-density drives and threw in a bunch of other new goodies, and then there was 3.1, which supported networking. Anybody got a copy of 3.2? It supports 3½-inch floppies. And it is good.

MS-DOS in all its incarnations, however, has sported some nasty faults. Peter Norton remedied a few severe ones with his Norton Utilities package, which allowed, among other things, the restoration of erased files. But MS-DOS is still getting old and tired. It can access no more than 640K of memory, and lacks the capability for concurrency.

More importantly, though it has been refitted to cover the exigencies of the 80286 chip as best it can, the AT is not well served by MS-DOS. Nor will the coming crop of 386 machines.

Microsoft will release a new DOS in early 1987. It will be designed specifically for the 286 and 386 series. It will not run on less powerful machines. Offering up to 16 Meg of usable memory, the operating system will also allow multiple applications to run simultaneously. It will also retain compatibility with its ancestors, now in need of a long-deserved rest.

With a keystroke, users will call up a "session manager" box, which will coordinate various desired memory-resident programs. As its predecessors, the new DOS will be command-line based, and capable only of displaying a single active application. However, a new version of Microsoft Windows, available separately, will allow you to view several applications simultaneously.

Microsoft's new DOS is still designed for single-user systems, but will feature support and security for LAN systems as well.

12. **IBM loses its mystique, and its micro market share.** Big Blue will be feeling bluer in 1987. No one is about to knock them entirely out of the box, but inexpensive clones and the continued reign of MS-DOS will continue to be felt, and felt hard, in 1987.

In 1981, when the IBM PC arrived on the scene, those three letters, IBM, were like a badge. In a sense they validated the utility of the microcomputer as a serious product, and many viewed the future as it would be beneficently guided by this omniscient megapresence. The IBM PC in fact wrested the market away from smaller competitors, and enstated a product that was neither first nor best as the "standard."

It was pointed out above how much more savvy we are nowadays, and it is easy to forget how naive we once were. When IBM first started making serious mistakes, many of us were quite surprised. I can remember standing in a plush private room in the Las Vegas Convention Center staring at the keyboard of the brandy-new IBM PCjr, my eyes glazed over. How could they do such a thing?

The mistakes have been real, and there is quite a history of them, actually. There were the marketing errors of the Selectric typewriter, giving away a

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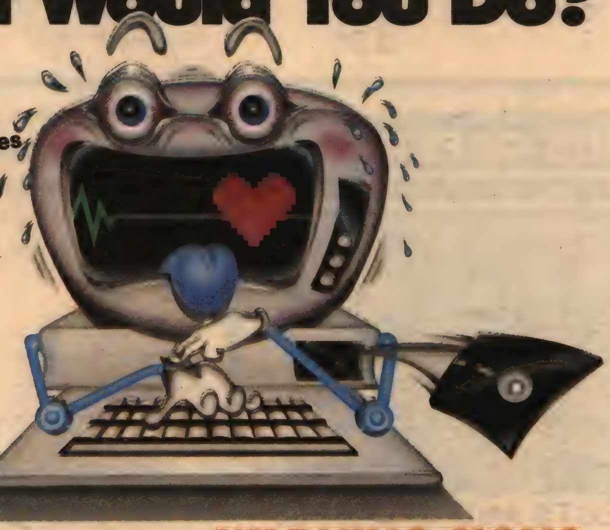

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What's New

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chunk of market to Xerox and the Japanese. There were the marketing errors of the dedicated word processor, giving away a chunk of market to Wang and others. There were the marketing errors of the minicomputer, giving away a chunk of market to DEC. Then there were the marketing errors of the microcomputer, eventually giving away a chunk of market to the clone makers.

It will be too late for IBM to do very much this year to turn the tide. They will introduce their own 386 machine at long last, with, no doubt, an attempt to hold back some part of their creation as proprietary. But the standard is out of their hands (see Stan's fine editorial on the topic in the December issue).

The King doesn't feel very well, and the prognosis is rather bleak. Long live the Clone!

13. **Copy protection is largely abandoned.** While we don't expect to see the process of copy protection come to a total halt in 1987, the endless spiral of new techniques and new technique-busters will finally be broken. The user will assert his need to protect his software investment, and the proliferation of the hard disk will serve to solidify this view. While piracy costs software developers tremendous amounts of money, so does the continual investment in new sources of copy protection. A general trend toward dramatically-lowered software prices will help offset increased piracy, and houses that want ironclad protection can publish on CD. As far as magnetic media goes, the coming year will see a reversal in the protection trend that has shackled the industry for so long.

14. **Slow movement toward standards continues.** Don't hold your breath on this one—it's not going to happen in 1987, 1988, or 1989. But, like Reagan and Gorbachev in Rekjavik, it's a good sign just to be talking. I have a dream: Someday, all the microcomputers of the world will live in peace with one another; someday, all the microcomputers (and peripherals) in the world will be able to talk to each other via a standardized interface; someday, all the microcomputers in the world will be able, willing, and encouraged to share data. I have a dream...

15. **Prices continue to drop, on hardware and software.** This one you can literally put your money on. You've heard the comparisons—if computers were cars, you could buy a Rolls Royce for $100, all that kind of stuff. The thing is it's really true, and will continue unabated in 1987. What other industry can you name where prices have plummeted so dramatically and so regularly?

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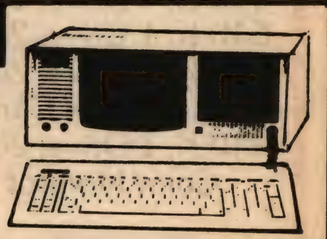

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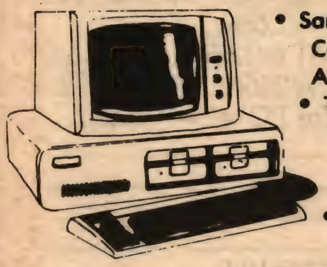

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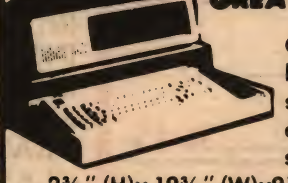

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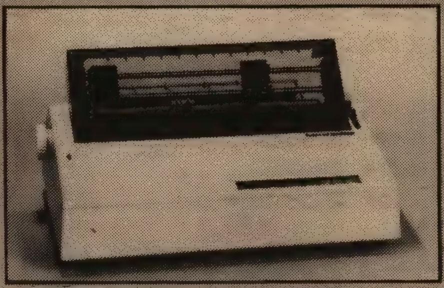

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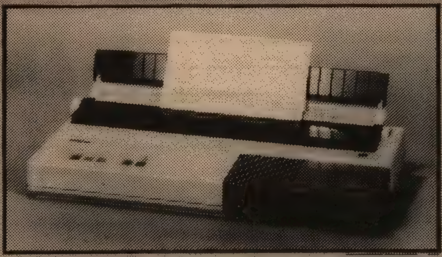

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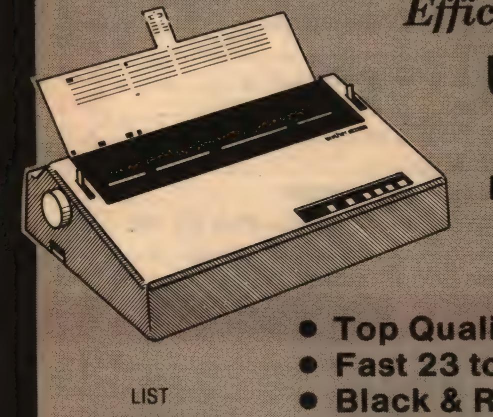

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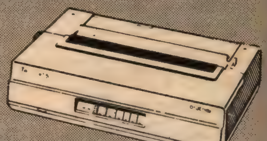

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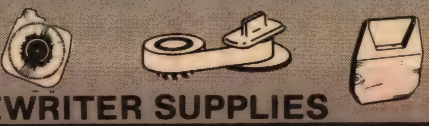

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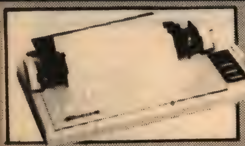

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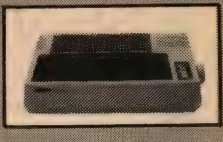

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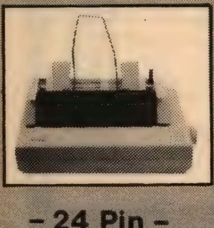

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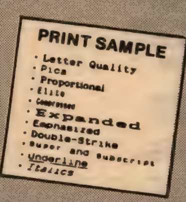

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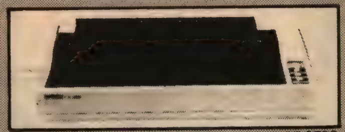

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- An 8K internal buffer allows you to print and use your computer at the same time.
- Exclusive SelecType feature delivers numerous popular typestyles at the touch of a button.

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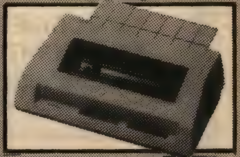

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Print Head: 8-pin, staggered arrangement

Character Sets: Standard 96 ASCII printing in 17 fonts

Line Spacing: n/180 in (n=0-255)

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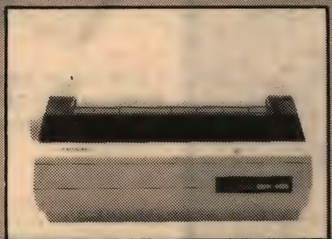

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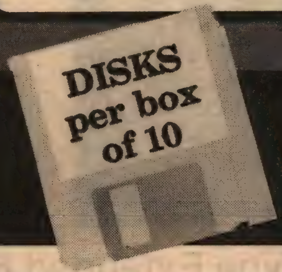

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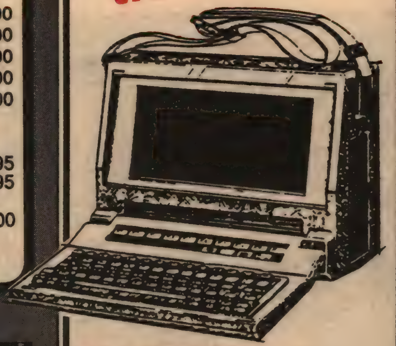

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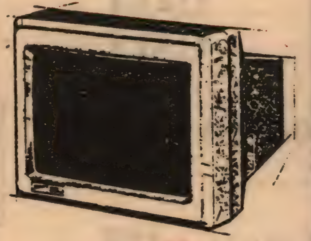

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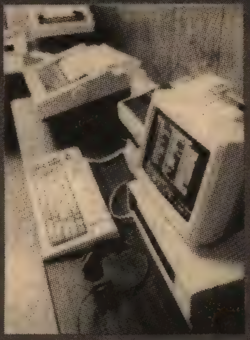

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- ONE 1.2 MB FLOPPY
- 5060 AT KEYBOARD
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- SERIAL/PARALLEL PORTS
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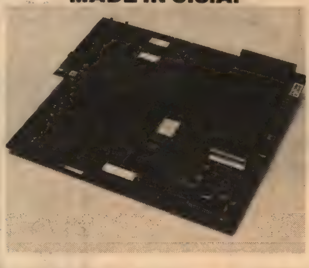

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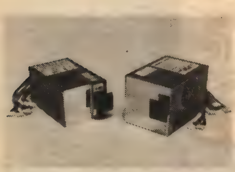

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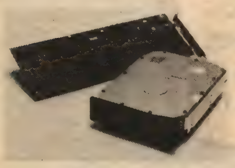

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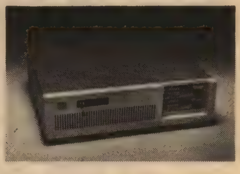

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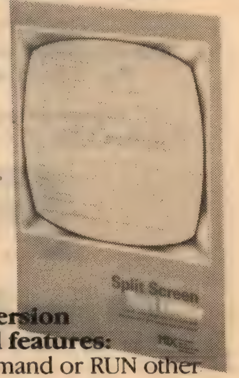

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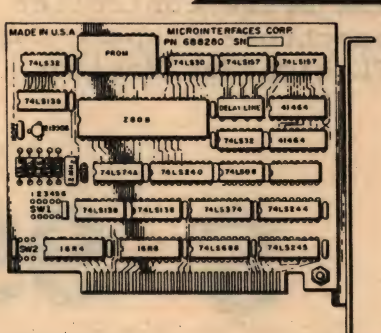

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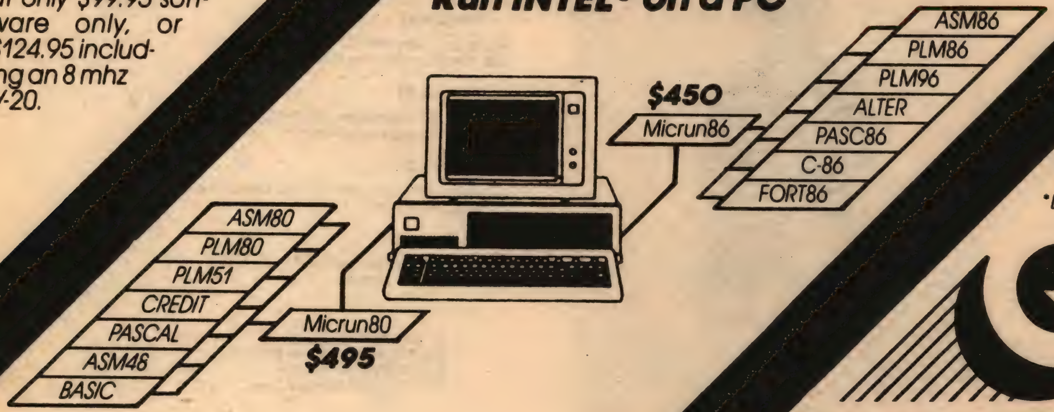

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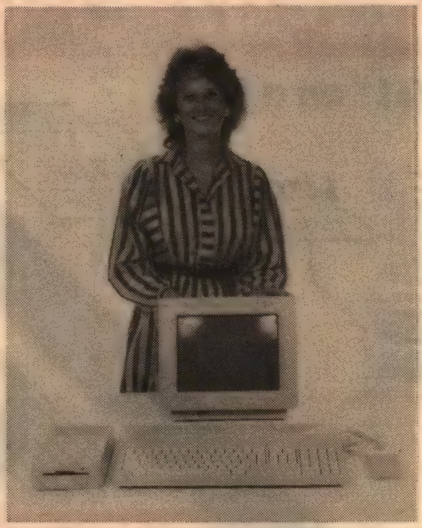

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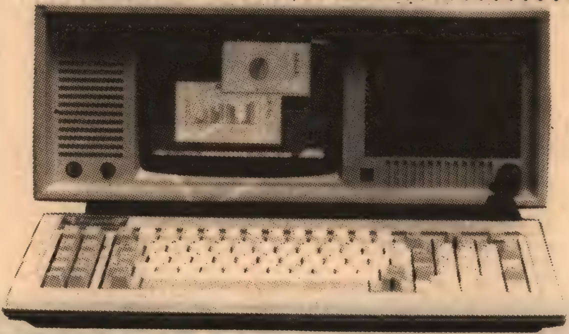

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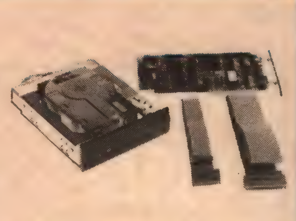

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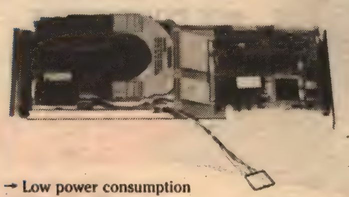

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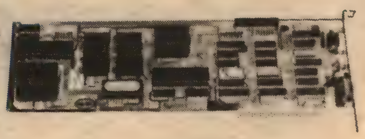

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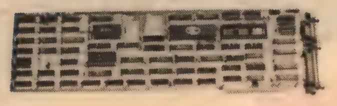

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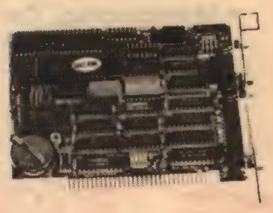

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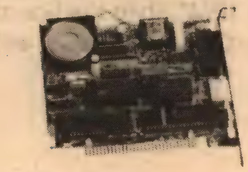

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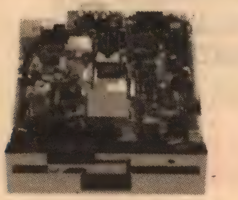

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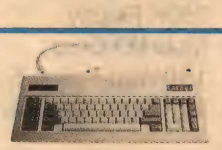

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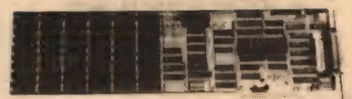

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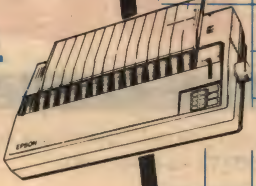

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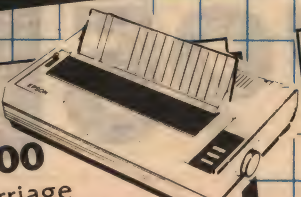

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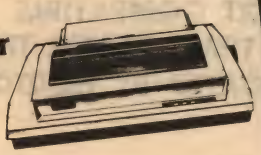

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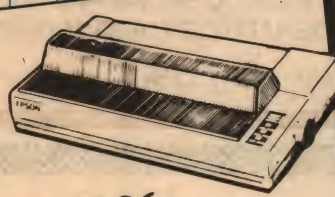

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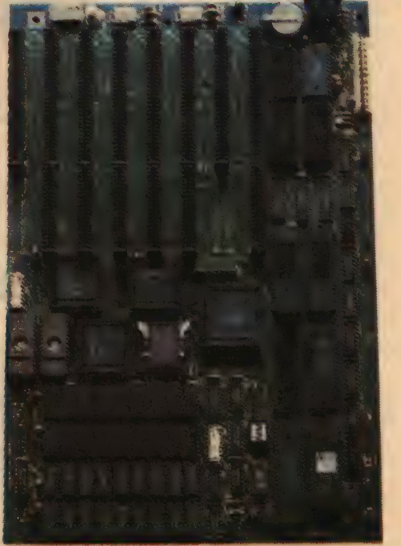

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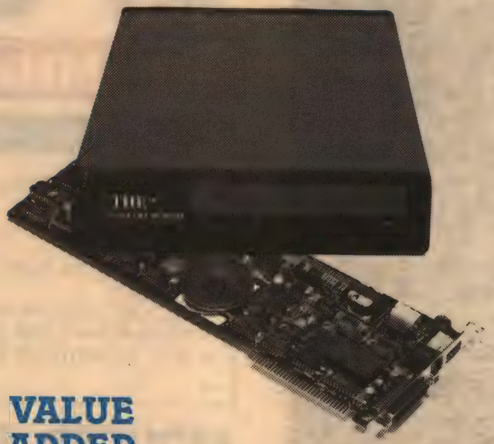

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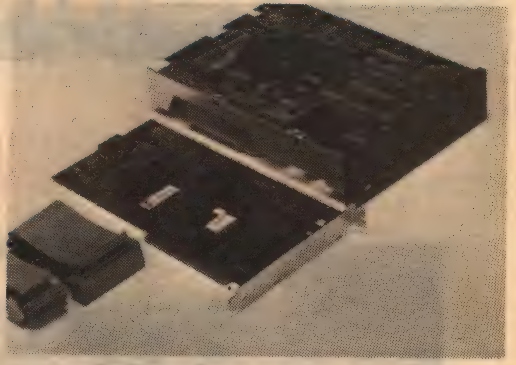

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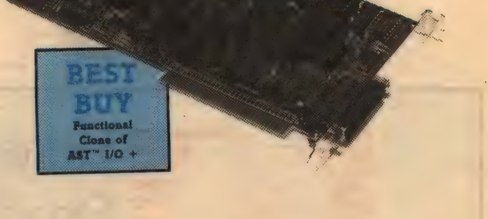

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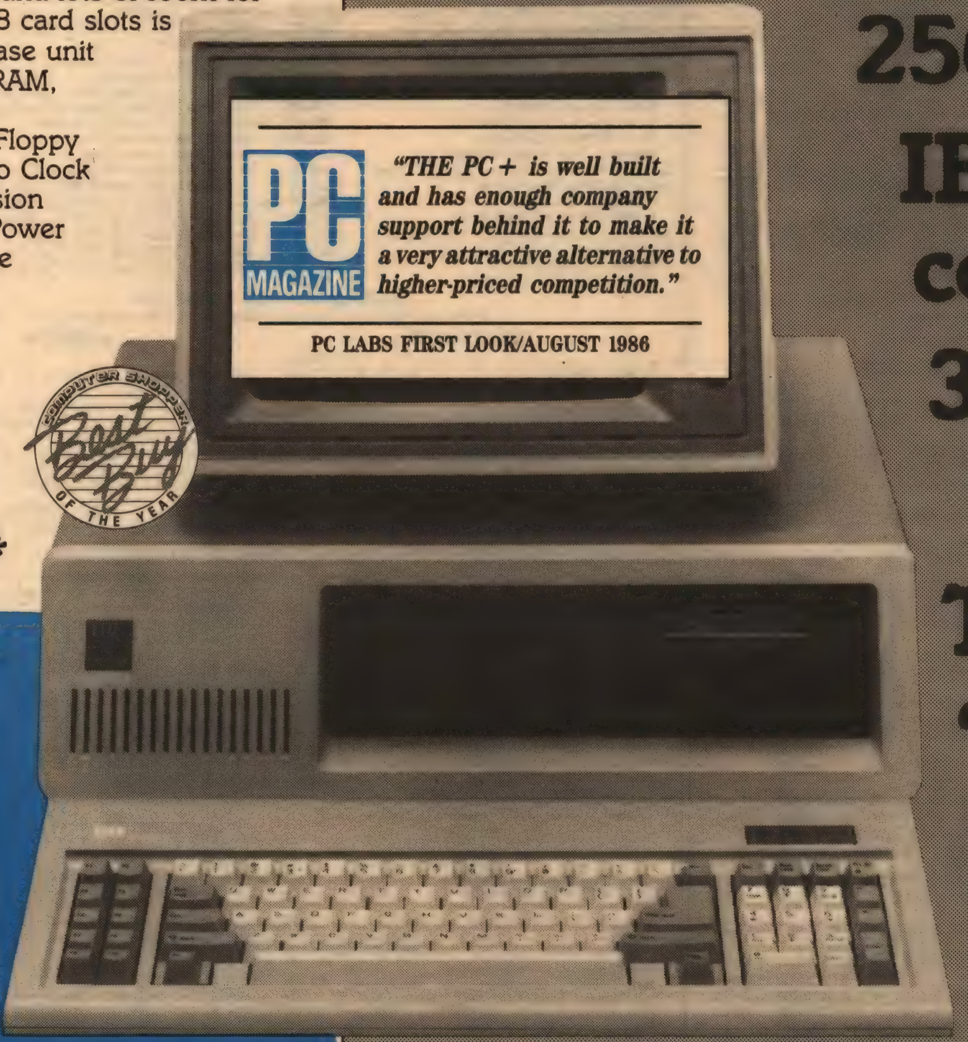

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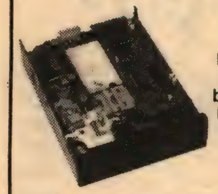

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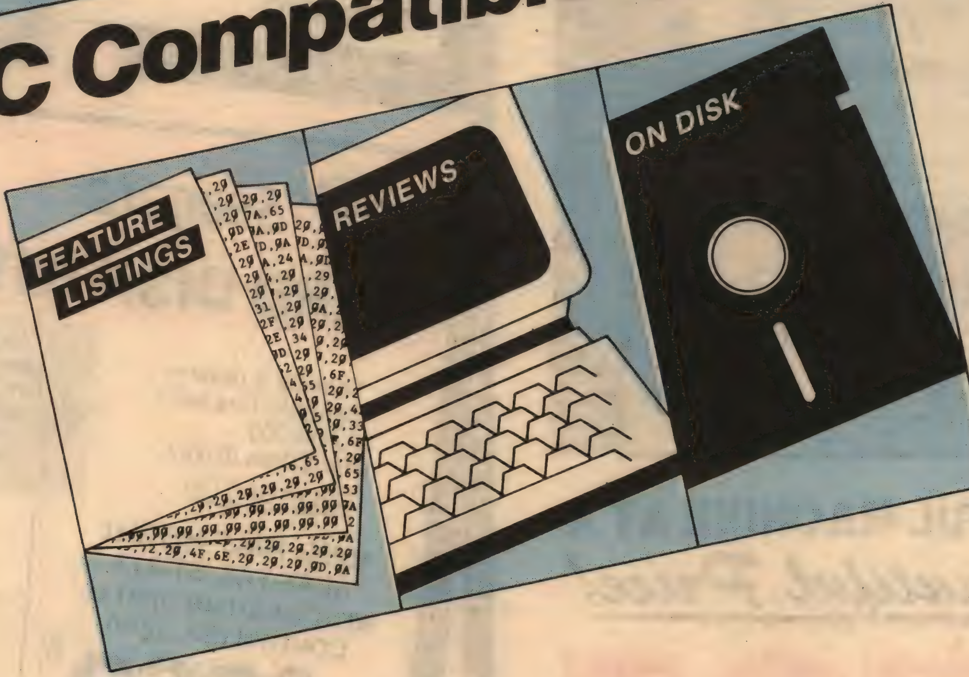

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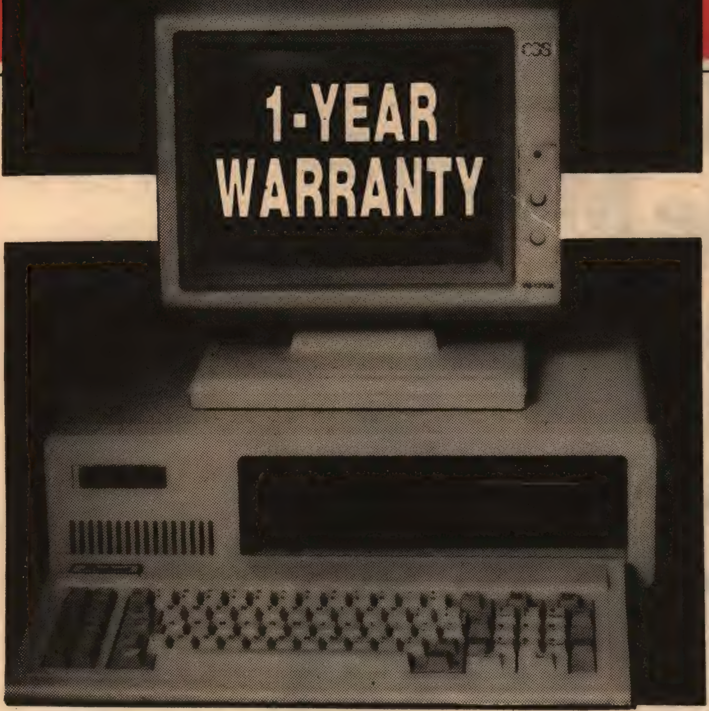

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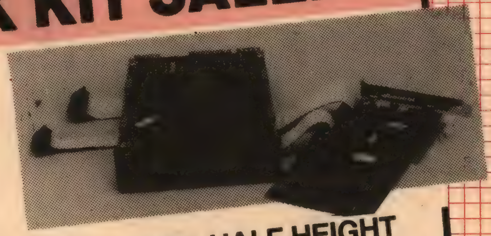

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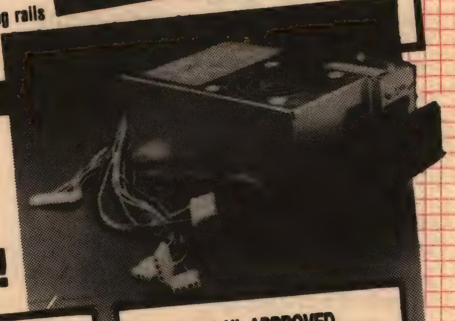

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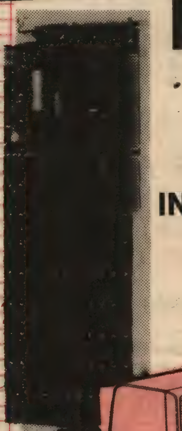

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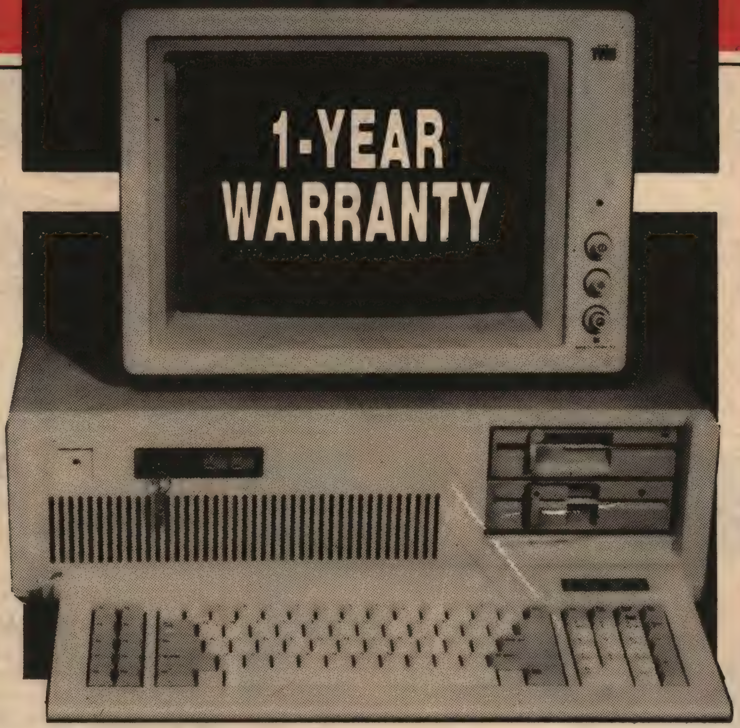

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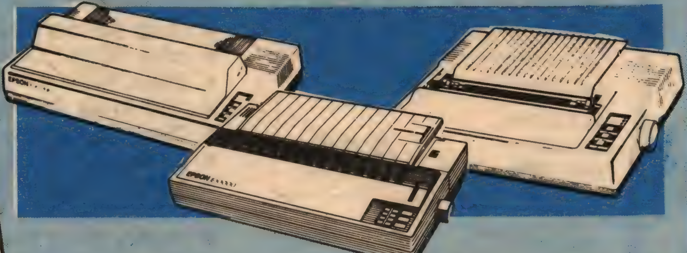

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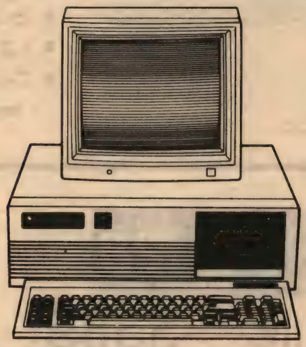

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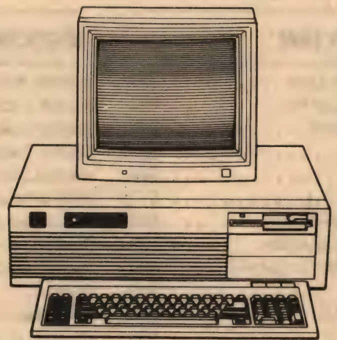

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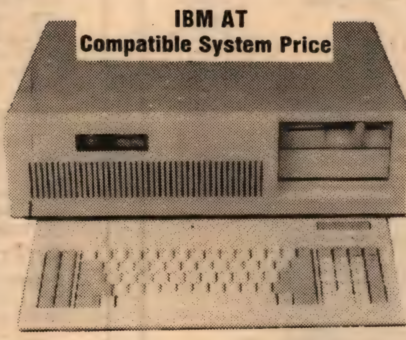
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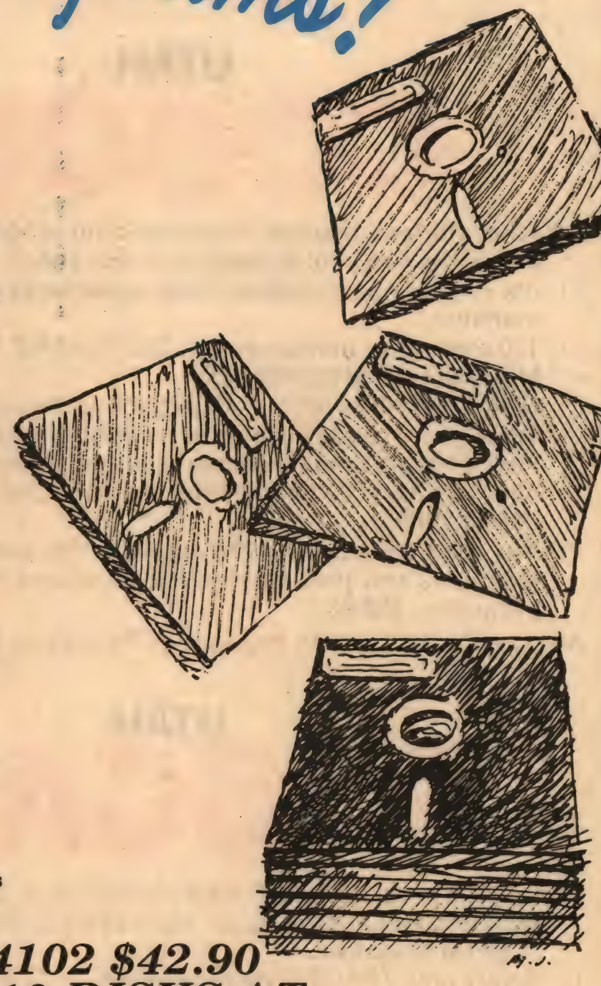

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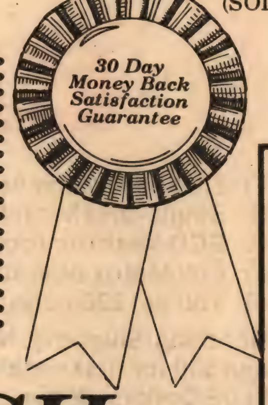

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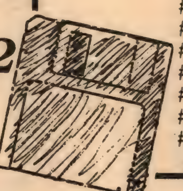

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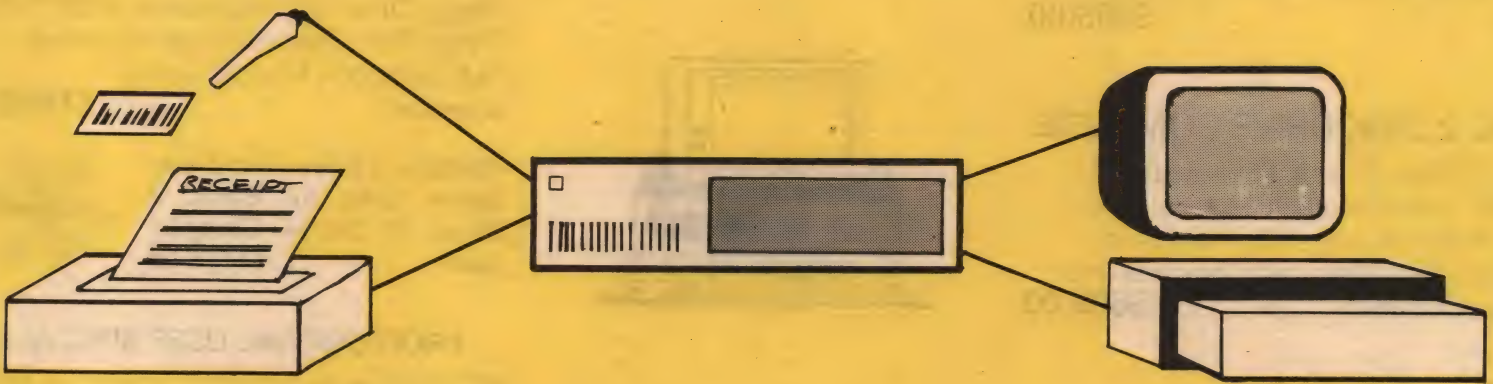

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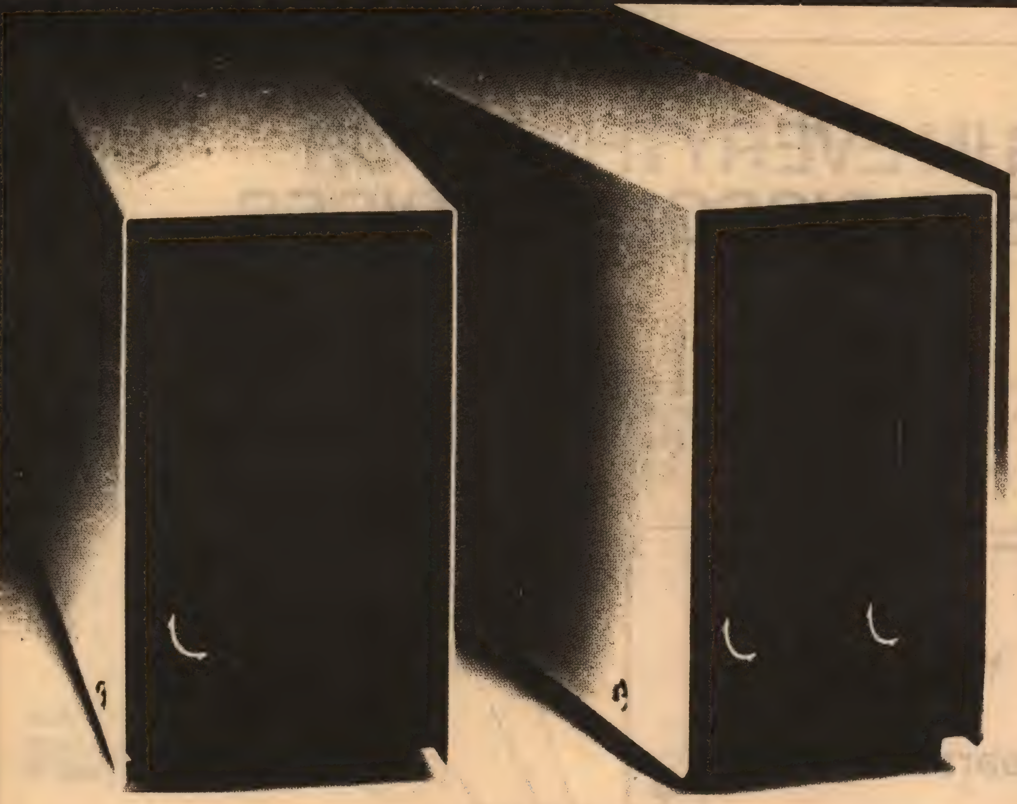

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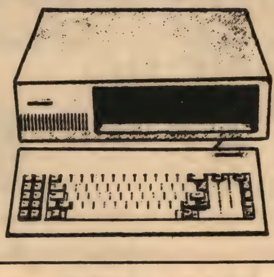

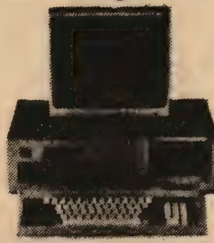

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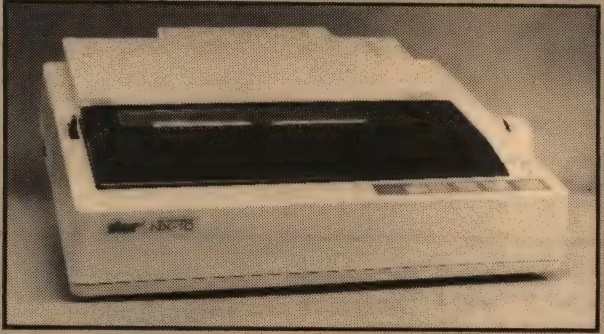

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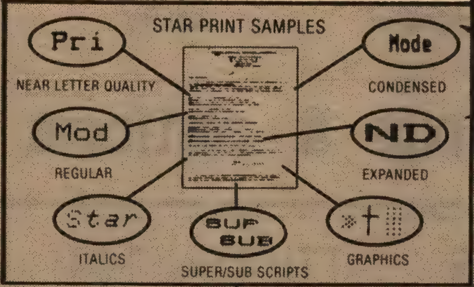

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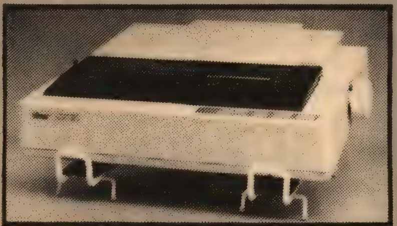

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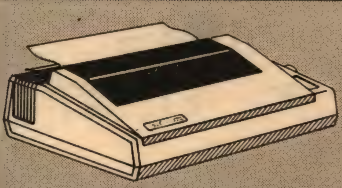

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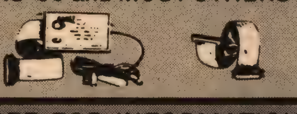

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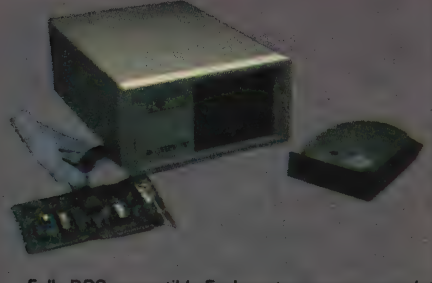

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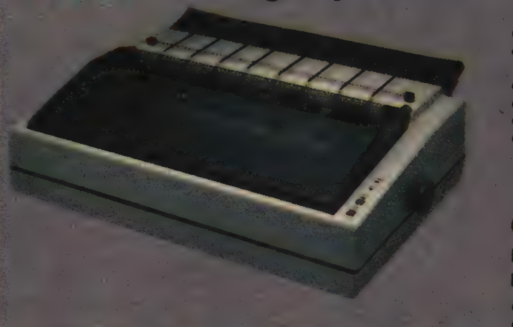

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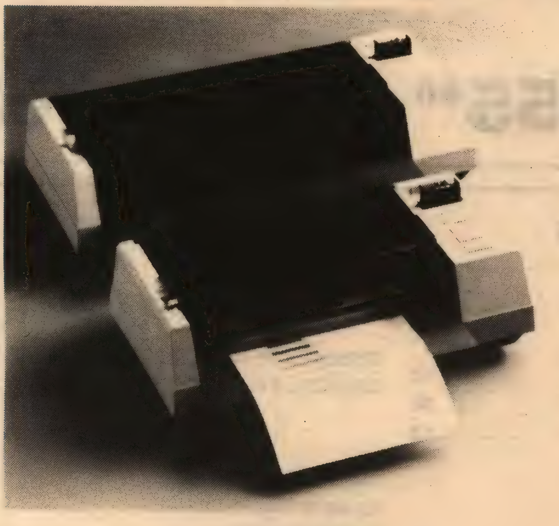

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Resistivity	less than 5 × 10^{8} ohms per square
Clipping level	75%-guaranteed 50%
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Packing Density	up to 7958 BPR
Track density	48 TPI
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Starting	1.0 ounce force in. max.
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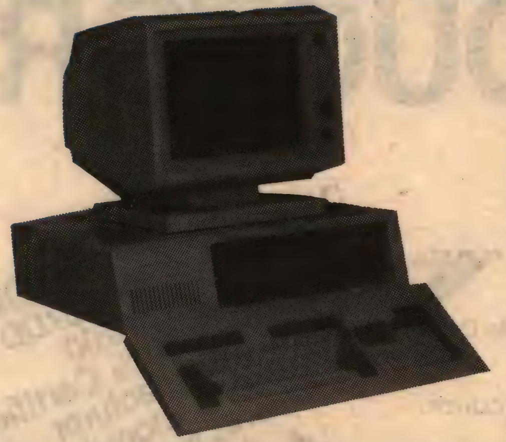

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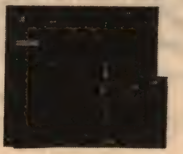

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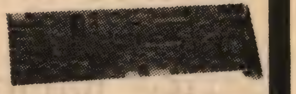

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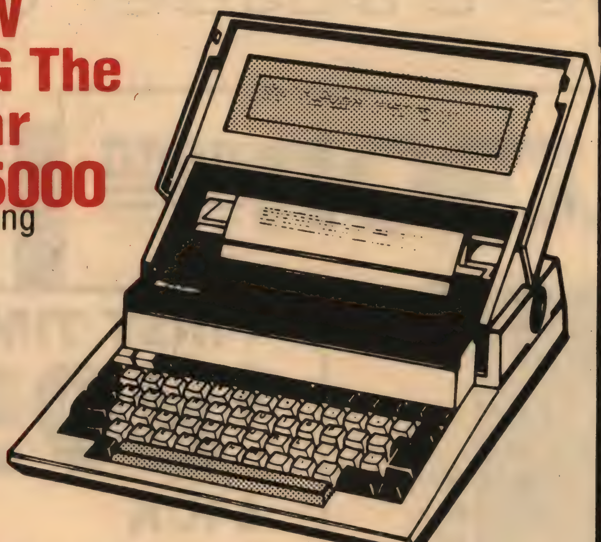

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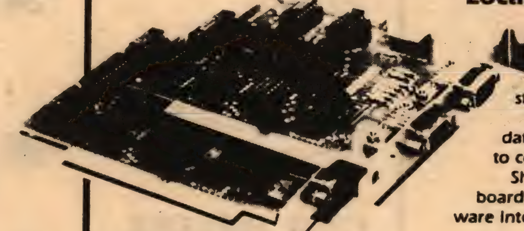

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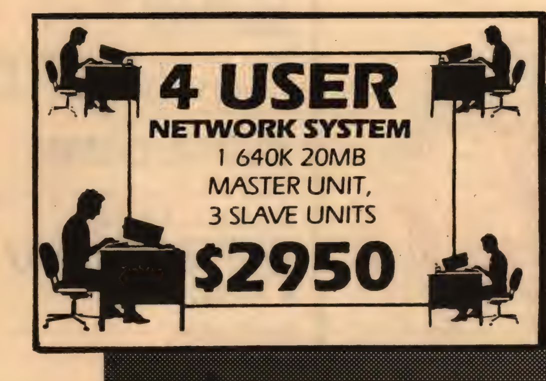

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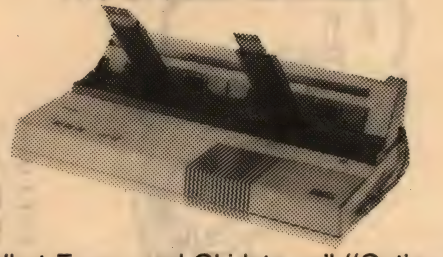

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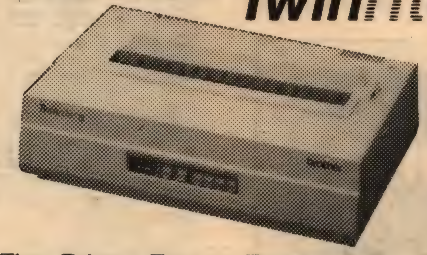

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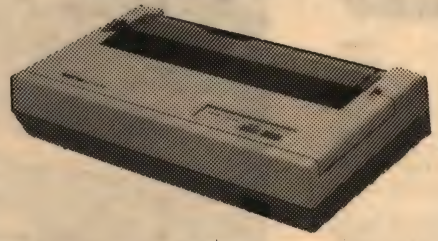

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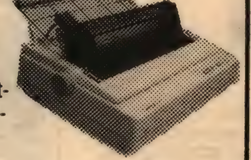

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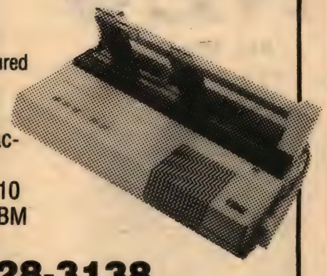

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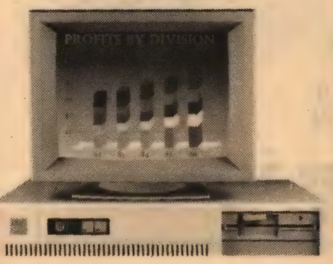

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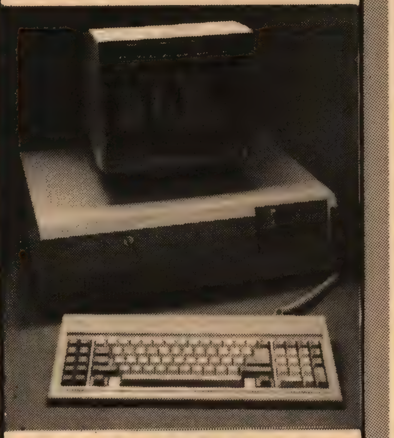

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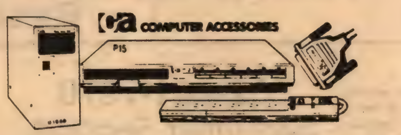

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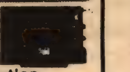

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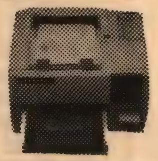

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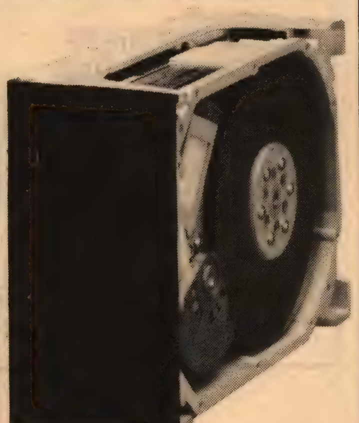

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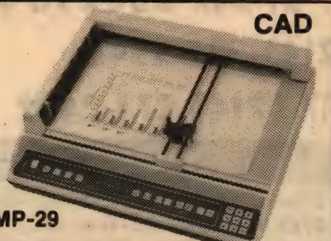

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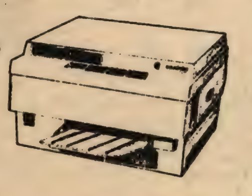

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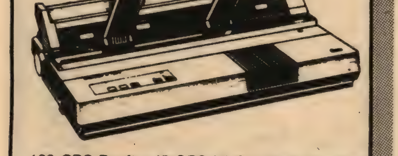

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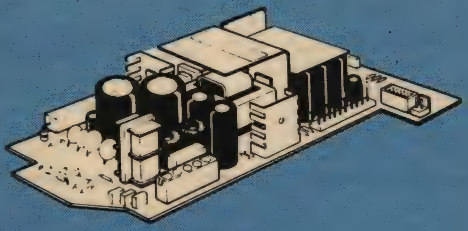

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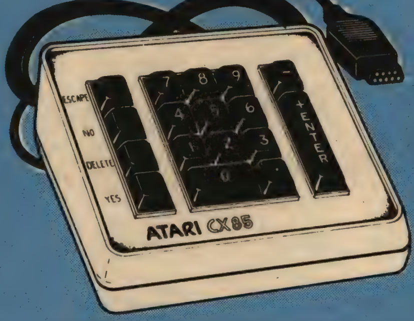

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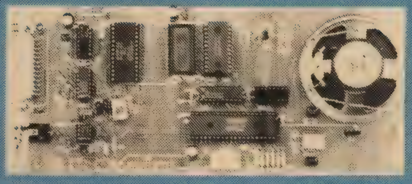

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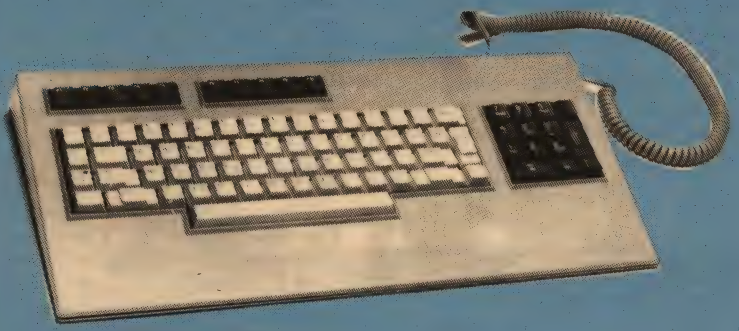

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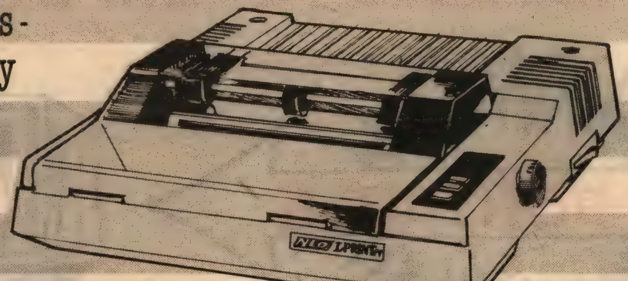

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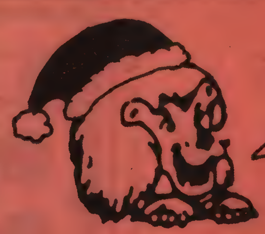

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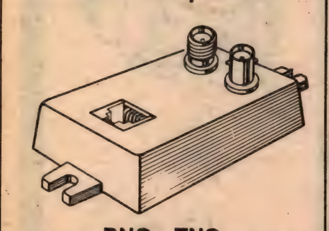

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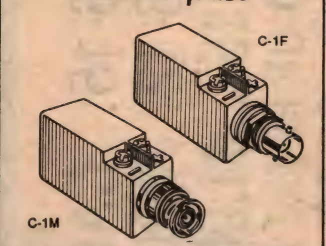

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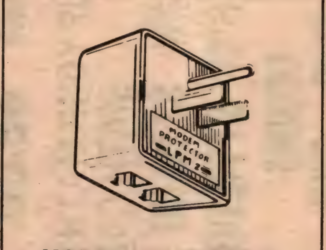

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SURGE SUPPRESSOR PROTECTS against lightning and other electrical disturbances. Our 2-stage design provides a sophisticated blend of high speed, gas discharge and voltage limiting in nano seconds. Proper ground is most important & L-com has solved this by making use of your grounded AC outlet. The protector recovers automatically in preparation for next surge.

MODEL	CLAMP	1-9	10-24	25-99
LPM-2	*25V	33.00	29.70	26.40
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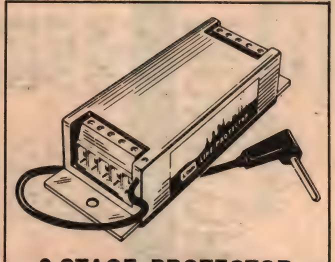

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MODEL	PROTECTION	1-9	10-24	25-99
LPU-34A	RS422 (6.8V)	78.00	70.20	62.40
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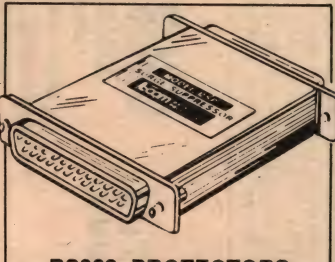
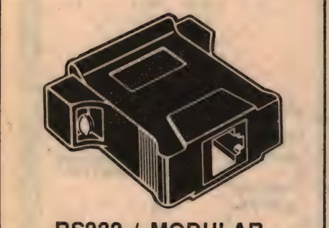
Note: A wide variety of protection devices are offered by L-COM including custom designs.



RS232 PROTECTORS

SURGE PROTECTORS guard against voltage spikes entering your RS232 ports. MOVs on crucial lines clamp electrical surges above 26V without affecting operation. Mounts in series, and all lines are wired thru. Surges clamp to pin 1. All metal case construction.

MODEL	LINES	1-9	10-24	25-99
DSPS-3	2, 3, 7	24.95	22.70	19.96
DSPS-4	2, 3, 7, 20	26.95	24.52	21.56
DSPS-5	2, 3, 4, 5, 7	28.95	26.34	23.16
DSPS-5B	2, 3, 4, 7, 20	28.95	26.34	23.16
DSPS-6	2, 3, 4, 5, 7 ,20	30.95	28.16	24.76
DSPS-8	2, 3, 4, 5, 6, 8, 20	34.95	31.80	27.96



RS232 / MODULAR ADAPTORS

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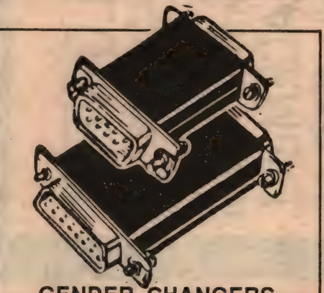
MODEL	GENDER	1-9	10-24	25-99
RA-6F	Female	7.85	6.91	6.12
RA-6M	Male	7.85	6.91	6.12



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GENDER CHANGERS mate non-mating cables. Heavy duty insulated metal enclosure to stand wear and tear. Your choice of 9, 15, 25, 37 & 50 pin D-Sub connections. Model number provides for gender choice. All in stock for immediate delivery.

MODEL	(*) Specify Gender	1-9	10-24	25-99
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MG-15(*)	M-M or F-F	18.95	17.24	15.16
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MG-37(*)	M-M or F-F	27.95	25.43	22.36
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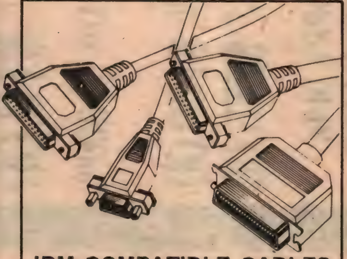

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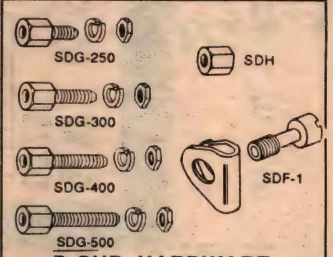
MODEL/FT.	1-4	5-9	10-24
CMX-6	20.97	19.92	18.87
CMX-12	23.97	22.77	21.57
CMZ-6	16.17	15.36	14.55



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Standard 4-40 **HARDWARE** mates with all D-Subs. Sold only and priced in packs and multiples of 50. SDG thread lengths of .25 to .5".

MODEL/LGT	DESC.	1-9	10-24	25-99
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SDG-300	Jack Screw	8.95	8.50	7.88
SDG-400	Jack Screw	9.45	8.98	8.32
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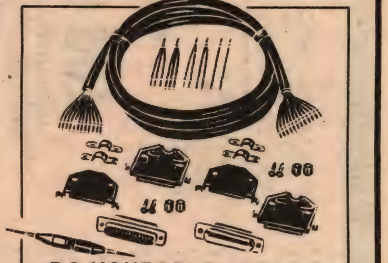
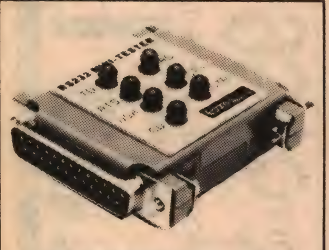
SDH	Standoff	5.45	5.18	4.80
SDF-1	Screw and Retainer	9.45	8.98	8.32



DO-YOURSELF CABLES

RS-232 CABLE KITS allow you to create your own Serial data cable. 12 conductor cable terminates to gold plated pins; simply insert into appropriate holes with tool provided. Everything you need is supplied. Please specify gender when ordering, (*) M-M or M-F.

MODEL-FT	(*)Specify	1-9	10-24	25-99
CK25(*)-5	M-M or M-F	13.95	13.25	12.56
CK25(*)-10	M-M or M-F	15.95	15.15	14.36
CK25(*)-15	M-M or M-F	17.95	17.05	16.16
CK25(*)-25	M-M or M-F	21.95	20.85	19.76



DATA LINE MONITOR

A miniature **DATA LINE MONITOR** allows the user to determine the status of the seven key signals of the RS-232 data path. All 25 pins wired through, and dedicated Red LEDs report the status of:

- Transmit Data (TD) pin 2
- Receive Data (RD) pin 3
- Request to Send (RTS) pin 4
- Clear to Send (CTS) pin 5
- Data Set Ready (DSR) pin 6
- Data Carrier Detect (DCD) pin 8
- Data Terminal Ready (DTR) pin 20

MODEL	CASE MAT'L	1-9	10-24	25-99
DLM	Plastic	29.95	27.25	23.96
DLMS	Metal	32.95	29.98	26.36

MINI BREAKOUT BOX

DATA TEST ADAPTOR aids in the design of new interfaces such as printers and terminals. Now it's easy to configure cable connections or signal paths. All 25 pins of each D-Sub connector terminate to individual patch jacks to allow inter-wiring in any pattern. Complete with 25 jumper wires. Metal construction. All pins are identified on label.

MODEL	GENDER	1-9	10-24	25-99
DTAS	M-F	29.95	27.25	23.96

POPULAR COAX CABLES

Finest **COAXIAL CABLES.** Each has two male BNC connectors with molded strain reliefs. Only most popular lengths are shown, but in stock up to 100 ft. Be sure to specify (*) cable type; RG58C, 59B or 62A.

MODEL/FT.		1-9	10-24	25-99
CC(*)-0.5		3.45	3.14	2.97
CC(*)-1	(*)	3.65	3.32	3.14
CC(*)-2.5	Specify	4.05	3.69	3.48
CC(*)-5	RG Type	4.75	4.32	4.09
CC(*)-10		6.25	5.69	5.38

MAKE YOUR OWN TELCO CABLES

Everything you need to assemble your own 4 or 6 wire modular cables. Modular plugs with gold contacts, flat cable in 100 ft. rolls and crimping tools of your choice. Other Telco products and accessories also available.

MODEL	DESC.	QTY/PKG.	1-9	10-24
TD6P4C	4-Plug	100	25.50	22.44
TD6P6C	6-Plug	100	38.00	33.44
TDB4-100	4-Wire	100 Ft.	6.50	5.72
TDB6-100	6-Wire	100 Ft.	12.50	11.00
TDH522C	4-Tool	One	6.95	6.12
TDH522D	6-Tool	One	7.95	7.00

L-com First

OUR BEST TWINAX CABLES

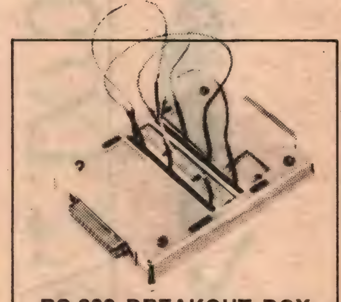
L-COM is first to offer **TWINAX CABLES** with molded terminations on each end for exceptional life and better flexibility. Longer lengths are also available.

MODEL/FT.	1-9	10-24	25-99
CCTXM-1.5	32.75	29.80	28.17
CCTXM-3	33.50	30.49	28.81
CCTXM-5	34.50	31.40	29.67
CCTXM-7.5	35.75	32.53	30.75
CCTXM-10	36.95	33.62	31.78

RS232 LINE BOOSTER

Doubles operating distance of EIA lines. Booster receives signal, strengthens, filters out noise, converts electrical characteristics and then retransmits. Usable to 19.2K baud, both syncronous and asynchronous modes. 7 lines amplified are: 2 thru 6, 8 and 20. Includes a spare amplifier to wire as needed. Supplied with 115VAC supply.

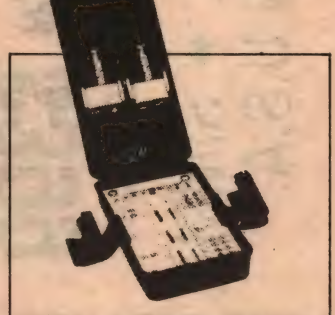
MODEL	1-9	10-24
DG-013	84.95	77.30



RS-232 BREAKOUT BOX

An economical **BREAKOUT BOX** allows easy configuration of the RS-232 interface. Each line of the interface, with the exception of pin 1 can be programmed by 24 independent slide switches. 24 test points also provided on each side of the program switches to allow patching and monitoring. Supplied with 10 jumper cables and carry case. Rugged steel construction.

MODEL	GENDER	1-9	10-24	25-99
RS-50	M-F	59.95	54.55	47.96

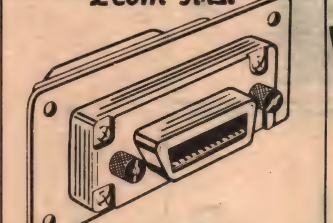


RS232 ACTIVITY TESTER

A self-contained **MONITOR & TESTER** for all I/O conditions. Features: 24 switches and jacks to program and patch; twelve 2-color LEDs read lines, 2 thru 6, 8, 15, 17, 20, 21 & 25; one spare LED for patching and one more LED is dedicated as a pulse trap to monitor Hi-Speed signals. Supplied with two 9V batteries.

MODEL	1-9	10-24
DG-005	189.95	172.85

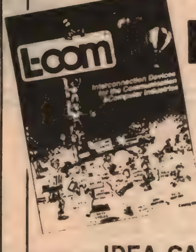
L-com First



IEEE-488 BULKHEAD ADAPTOR

L-COM is first to offer this **GPIB FEED-THRU ADAPTOR** which allows the IEEE-488 cables to pass through a panel. All metal construction with Male/Female connections. We also have a complete line of GPIB cables and many other accessories, all available from stock. Ask for details.

MODEL	GENDER	1-9	10-24	25-99
CIB24-BA	M-F	22.52	21.38	20.25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Interconnection Devices for the Communications & Computer Industries

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Over 1700 **COMPUTER ACCESSORY** products, many are unique to help solve data communication problems. A convenient shoppers guide which provides technical information, comparisons and quantity pricing. Includes coaxial & multi wire data cables, connectors, IEEE-488 products, switch boxes, patch panels, wall plates, testers, baluns, surge protectors, etc. Same day shipping of almost every item listed. Call Customer Service today at (617) 682-6936 for your FREE personal copy.

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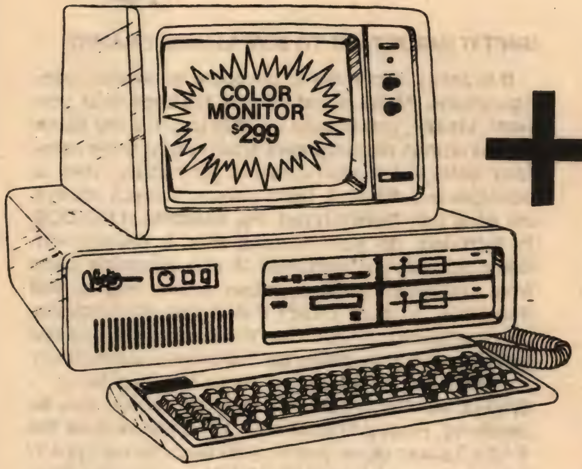

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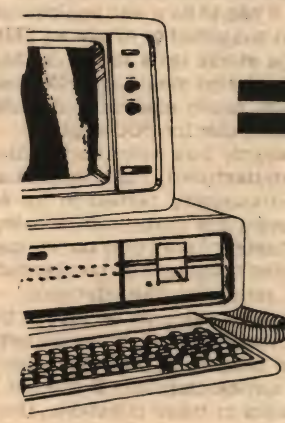

= $995

8 Slots
+ 4 Slots
= 12 Slots

2 Drive Openings
+ 2 Drive Openings
= 4 Drive Openings

COMPARE GODFATHER'S HARDWARE

	VIOLIN-ATC	COLUMBIA ATC-6000	IBM AT	YOUR CLONE
# of Expansion Slots	12	12	8	?
# of ½ Height Drive or Tape Slots	5	5	4	?
# of Drive Slots in Front of Case	4	4	2	?
Clock Speed MHz	6 or 8	6 or 8	?	?
Memory Included as Standard	512K	512K	?	?
Max Memory on Motherboard	1024K	1024K	?	?
Power Supply Watts	230	230	192	?
Manual Reset Switch	YES	YES	NO	?
Runs UNIX	YES	YES	YES	?
EGA Card Compatible	YES	YES	YES	?
80287 Math Coprocessor Slot	YES	YES	YES	?
Clock Calendar	YES	YES	YES	?
Godfather's Factory Service	YES!	YES!	NO!	NO!

Huge Bundle is available separately (without MS-DOS) for $300 for other clones!!

INSTALLED OPTIONS IN COMPUTER*

20 Meg Hard Drive	$349*
2 Hard 2 Floppy Controller w/cables	$189*
1.2 Meg or 360K Floppy	$135*
Internal Memory to 1 Megabyte	$149*
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Keyboard (AT-Style)	$ 75*
MS-DOS 3.2 & GW-Basic	$ 95*
Huge Software Bundle with THEMENU	$ 95*

**Free Installation and Burn In! Call for Other Options.*

Few machines can match the hardware features of the VIOLIN-ATC, but they may try to do so in the future. To stay ahead of the rest we are including lots of software to this long list as it becomes available to us. Your hard drive will come already loaded and tested with most of this software, configured with an easy to use menu system so you will not have to learn MS-DOS as soon as you start. We have tested a large number of software packages and have found that the VIOLIN-ATC runs all the same software as the IBM-AT that we tested.

THESE PROGRAMS ARE INCLUDED IN HUGE SOFTWARE BUNDLE: MS-DOS 3.2 • MS-DOS tutorial • BASIC & BASICA • TIM-IV relational data base • Perfect Filer DBMS • Perfect Writer • Perfect Writer tutorial • Perfect Speller (50,000 words) • Perfect Calc spreadsheet • Perfect Calc tutorial • Fast Graphs • Perfect Link (modem program) • Home Accountant Plus • Hardware Diagnostics • THEMENU system •

Besides these, the VIOLIN-ATC runs all the popular IBM programs such as LOTUS, DBASE, AUTOCAD, WORDSTAR 2000, WORD PERFECT, and many more.

We insure your VIOLIN-ATC will work reliably because of our extensive burn-in and testing. If service is required you can be assured that we will promptly repair or replace your VIOLIN-ATC during your 180 day warranty. Parts and service will be available on a continuing prompt basis to serve you after that. Call before you order to confirm availablility and exact configuration as prices and specifications are subject to possible change. We also will custom confirgure your VIOLIN-ATC with reliable upgrades such as memory, monitors, EGA cards, larger or more hard drives and tape backups to maintain the quality you expect from Godfather's. I hope you are convinced that we have the best IBM-AT compatible, and for the best price anywhere.

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Columbia Data Products, Inc. Announces a New Program . . . The Rectifier!

NEW! INSTANT RESTORE PROGRAM! RESTORES YOUR HARD DRIVE TO LAST UPDATE AFTER ACCIDENTAL FORMAT, POWER OUTAGE WHILE WRITING, SABOTAGE, VIRUSES, OR OTHER NASTY UPSETS. ALSO INCLUDES SPEEDUP, WHICH OPTIMIZES YOUR HARD DRIVE PERFORMANCE. SIMPLE ONE PAGE MANUAL INCLUDED. ONLY $49, SITE LICENSES AVAILABLE.

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THE COMPATIBLE SHOPPER

(A Survival Guide to Computer Shopping)

(Or Why We Bought Columbia Data Products, Inc.!)

COMPATIBLE SHOPPER
SHOP 'til I DROP.
BORN TO SHOP!!
CHARGE!

As I was searching for a topic for this month's letter, my wife was absent-mindedly leafing through the pages of this magazine.

"LOOK, AN XT-COMPATIBLE FOR ONLY $250!!! AND A REAL IBM-XT FOR $1500!!" she exclaimed. Being a bargain-hunter at heart (her motto is "born to shop"), she was so excited that I hesitated to burst her bubble. "Read the fine print," I muttered, not bothering to explain the myriad of reasons behind such "too-good-to-be-true" prices. Then I realized I'd just stumbled across a topic for this column.

Our conversation went something like this:

WHAT'S THE DIFFERENCE, THEY ALL SAY "COMPATIBLE"?

Full software and hardware compatibility means that all software and hardware components are interchangeable and work the same in the original or in the compatible machine. True 100% compatible computers are counterfeits, so the trick is to find a computer that's functionally equivalent without being an illegal copy. How much compatibility you need depends on what you are using now. No problem. . . just ask the manufacturer if your software runs on his machine (if he can talk to the manufacturer — and he has tested it). But how DO you insure future compatibility when you need hardware or software enhancements? You choose a stable company that gets consistently high ratings for compatibility and one that can provide future support. For example, although industry experts have always ranked Columbia a top compatible, we recently discovered that it was not EGA compatible. So we changed the ROMBIOS in version 4.36 for their existing products from time to time. Many other large manufacturers who claimed full compatibility for their products, and then had them fail in the marketplace, are dropping some models because they are not as compatible as their newer ones.

CAN A COMPANY ADVERTISE A COMPUTER THAT IS AN ILLEGAL COPY?

Sure, it's done all the time by many vendors. Many computer products that come in from overseas have the ROMS removed before shipment so they can pass customs. IBM and others are now attacking the source of the supply instead of just the vendors. According to a recent article in *Infoworld*, "IBM is regularly testing PC clones for infringement of IBM's copyright on the BIOS software for its machine." If you purchase one of these questionable clones, you may own an orphan when legal problems cause the manufacturer to disappear. Columbia's ROMBIOS was designed independent from IBM and has never been challenged.

IF IT HAS A WARRANTY, IT MUST BE RELIABLE, RIGHT?

The warranty is important, but reliability involves several factors. First, it has to be a well engineered product that has been subjected to extensive EMI, heat, and high voltage stress tests to insure that the unit will last. It must also meet rigid FCC and UL requirements. (I was nearly electrocuted while testing an imported computer for FCC approval — we found the power supply was wired backwards. We rejected that manufacturer!) Each individual component must be thoroughly burned in for at least 72 hours to prevent 25¢ parts from causing $250 repairs. Some manufacturers only do sample testing, so some defective computers do get shipped. The most important reliability consideration — consistent performance — can only be judged by the computer's track record. What do the experts say? How many have been sold? Are the owners satisfied? Is there a service contract? If you can't get satisfactory answers to these questions, then beware.

WELL, WHAT ABOUT THE WARRANTY?

Warranties show the good intentions of the manufacturer. Few manufacturers plan to abandon their warranty, but lack of adequate planning and resources sometimes hinders performance. How many claims could be handled by a business offering a two-year parts, labor, and satisfaction warranty . . . from a company that started last week "building" computers in their garage? FCC and copyright violations can also hurt your chances of using your warranty since legal problems weaken the company. On the other hand, if a company enjoys a good service reputation along with a reliable product, you can be confident they will honor the warranty.

WHAT SHOULD I LOOK FOR IN EXPANDABILITY?

We may soon have 500 megabyte databases in the form of laser disks . . . but only if your computer can support the necessary hardware and operating systems. The number of expansion slots, size of the power supply, speed, number of drive openings, and memory capacity are also important factors if you want to add something that wasn't envisioned when the machine was originally designed. For example, when 8087 math coprocessors were selling for $400, some manufacturers did not include this socket. Although networking capabilities are still not widely needed, this is just one example of functions that may be excluded if your computer is not appropriately designed. Many manufacturers still do not include space for at least four drive-size devices or the power to run them. As you can see, it is very important for a manufacturer to plan for the implementation of new technology after the purchase.

ISN'T IT IMPORTANT TO BUY A NAME BRAND?

It is really important to compare equivalent configurations. Make a list of the features that you want. Ideally, you should be able to price the same combinations of equipment from two or three carefully selected manufacturers. In reality, this is possible but difficult, because you cannot always tell what they have left out. For example, if MS-DOS is included, do you assume that it comes with Basic and all the manuals? If you assemble parts from 10 different vendors, chosen strictly by price, will they "talk" to each other? If one part malfunctions, can you tell which one? Can you convince the vendor that it's not a software (or hardware) compatibility problem? Some additional facts to consider . . . **SPEED:** our tests indicated that CPU speed can be deceiving. Floppy Format took 106.5 seconds on the 8 Mhz Taiwan clone and only 69 seconds on the 4.77 Mhz Columbia! **COMPATIBILITY:** holding the alternate key down and typing in a 3-digit ASCII code should put any 256 ASCII code on the screen (a standard compatible feature) . . . worked on the Columbia (and IBM) — but not on the Taiwan clone!

IT LOOKS LIKE THE COLUMBIA IS A GREAT VALUE FOR THE PRICE. WHAT ELSE CAN YOU TELL ME ABOUT IT?

The fact that there are 70,000 Columbia owners says a lot about its popularity and reputation. They are also well supported by the Columbia Owners Group. COG is currently sending newsletters to 15,000 registered owners and plans to reach the others by word of mouth. Fully documented versions of DOS and BASIC, as well as a readable operations manual, are included in the purchase price. We have designed our latest Columbias so you can start using the computer immediately without having to learn DOS. We have done this by not only loading the hard drive with all the software, but by setting it up with a menu system that bypasses DOS commands. When you get ready to learn DOS, we not only have DOS tutorials but a unique on-line help feature as well. Just type "HELP" from DOS and your questions will be answered! (See the next few pages for many other Columbia features). And don't forget the seller's reputation. The Godfather has been around a few years and plans to protect his name. You can depend on Godfather's to stand behind its products.

After completing my short course in compatible shopping, Mrs. Godfather is sold on Columbia. She thinks you'll agree . . . IT'S AN OFFER THE DISCRIMINATING "COMPATIBLE SHOPPER" CAN'T REFUSE!!

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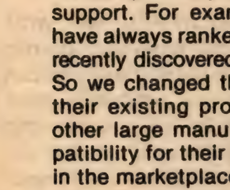

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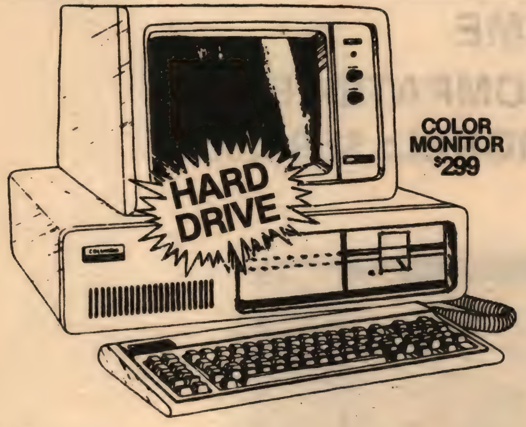

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DATA PRODUCTS, INC.

INSTALLED OPTIONS

20 MEG Upgrade	$249
Upgrade to 640K	$149
1200B Internal Modem	$199
Color Monitor w/stand	$299

Free Installation and Burn In!
CALL FOR OTHER OPTIONS.

2 Floppy System... Only $799

HARDWARE

• 128K RAM expandable to 1 Megabyte • 360K double-sided, double-density floppy drive • HD power supply that supports a 20-MEG w/tape back-up • Keytronics-style keyboard with lights • Two serial RS-232's & parallel port • Eight full-length IBM® -compatible expansion slots • 16-color CGA adaptor • **FCC, UL & CSA APPROVED!** Latest 4.36 EGA-compatible BIOS.

SOFTWARE

Lots of other machines can match the hardware features (without matching the price), but the main reason you want the Columbia is for its complete compatibility and a record of proven reliability. Virtually every software program and peripheral that function on an IBM PC work on the Columbia. The heart of each Columbia is the 8088® microprocessor, just as it's the heart of an IBM PC. And every Columbia is factory-configured to run MS™-DOS 2.11 and GW™-BASIC 2.0 (BASICA), much the same as the IBM PC operates PC-DOS and BASICA. The result is not just a degree of compatibility but the true standard ... Columbia!! Your Columbia comes with a huge bundle of software ... 16 FREE programs WORTH OVER $3000! It also comes with 5.7 MEG of software ALREADY INSTALLED on your hard drive PLUS THEMENU! This means you don't have to learn MS-DOS before you can run your Columbia!

These programs include: • MS-DOS 2.11 • MS-DOS tutorial • BasicA 2.0 (this runs all the IBM GW BASIC programs we tried) • Perfect Writer • Perfect Writer tutorial • Perfect Speller (50,000 words) • Perfect Calc spreadsheet • Perfect Calc tutorial • Perfect Filer DBMS • Fast Graphs (color) • Perfect Link (modem program) • Home Accountant Plus • Columbia MPC tutorial • TIM IV relational data base • Space Commanders • Hardware diagnostics •

Columbia also runs all the popular IBM programs such as Lotus 1-2-3, Symphony, dBASE III, Visacalc, Wordstar, Flight Simulator II, Microsoft Word, and many, many more!

WARRANTY

We offer a 90-day parts and labor warranty with our product. We also service the Columbia out of warranty (should you ever need it); in addition, ITT SERVCOM and Honeywell services out-of-warranty machines nationwide.

We hope you are convinced that the Columbia is the best IBM-compatible available . . . and that **GODFATHER'S** is offering it for the best price (for any comparable product) anywhere!

COG MEMBERSHIP

When you purchase your Columbia, you will undoubtedly want to immediately join the **Columbia Owners Group** (COG). Some of the advantages of membership are: • Quarterly newsletter to keep you informed of latest information on computer "tips and tricks," available upgrades and/or additional uses for existing hardware/software, a Contributor's Corner" for suggestions from other group members, etc. • Special pricing on items from Columbia Data Products, Inc. directly through the Columbia Owners Group •

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CEI 1060 (AT-COMPATIBLE)

BASIC MODEL: $1,195.00

with AWARD BIOS

FCC APPROVED

Lode Runner

INCLUDES:

- 512 KB Expandable to 1 MB on motherboard
- 1.2 MB floppy drive
- DTC floppy & hard disk controller with 4 adapters
- Intel 80286 true 16 bit Microprocessor
- 200W power supply with 4 drive power connectors
- Award BIOS
- 84-keys keyboard
- 7 DMA Channels
- 8 Expansion slots (6 of 8/16 bit, 2 of 8 bit)
- Built-in battery backup clock
- One year limited warranty

XT COMPATIBLE

BASIC MODEL: $695.00

INCLUDES:

- Intel 8088 Microprocessor
- 2-360KB Floppy drives with controller
- Video adapter
- 8 8-bit expanded slots
- Keyboard
- Power Supply

IBM-COMPATIBLE PARTS SPECIAL

XT PARTS:

Case for XT	$49.00
Color Card	$75.00
Color Card with printer port	$80.00
Disk drive card with cable (2 adapters)	$35.00
Disk drive card with cable (4 adapters)	$40.00
EGA Card	$229.00
EMS Card 2MB (OK)	$149.00
Floppy drive	$90.00
Hard Disk controller	$109.00
Hard disk drive Seagate 20 MB with controller	$389.00
Seagate 30 MB, ½ H, w/controller	$499.00
I/O Plus card P.S.C.	$75.00
Joystick for IBM	$20.00
Keyboard 5060 XT	$89.00
Modem 1200 Baud External	$139.00
Modem 1200 Baud Internal	$129.00
Monochrome Graphic/Printer adapter	$89.00
Mouse	$59.00
Multifunction card (OK on board)	$89.00
Multi-/IO card	$89.00
Parallel printer cable & other cables	$9.00
RAM card 576K (OK on board)	$49.00
RS-232 card	$39.00
Turbo XT Motherboard (4 layers)	$149.00
XT Mainboard	$119.00
XT Power Supply	$69.00

AT PARTS:

Case	$99.00
EMS Card 2 MB (OK)	$179.00
Floppy Drive w/cable 360 KB	$109.00
1.2 MB	$139.00
Hard Disk & Floppy drive card	$229.00
Hard Disk Seagate 30 MB	$599.00
40 MB	$699.00
80 MB	$1159.00
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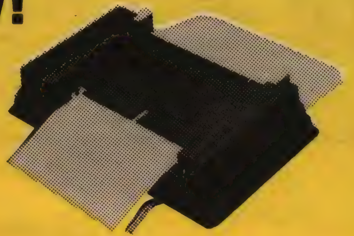

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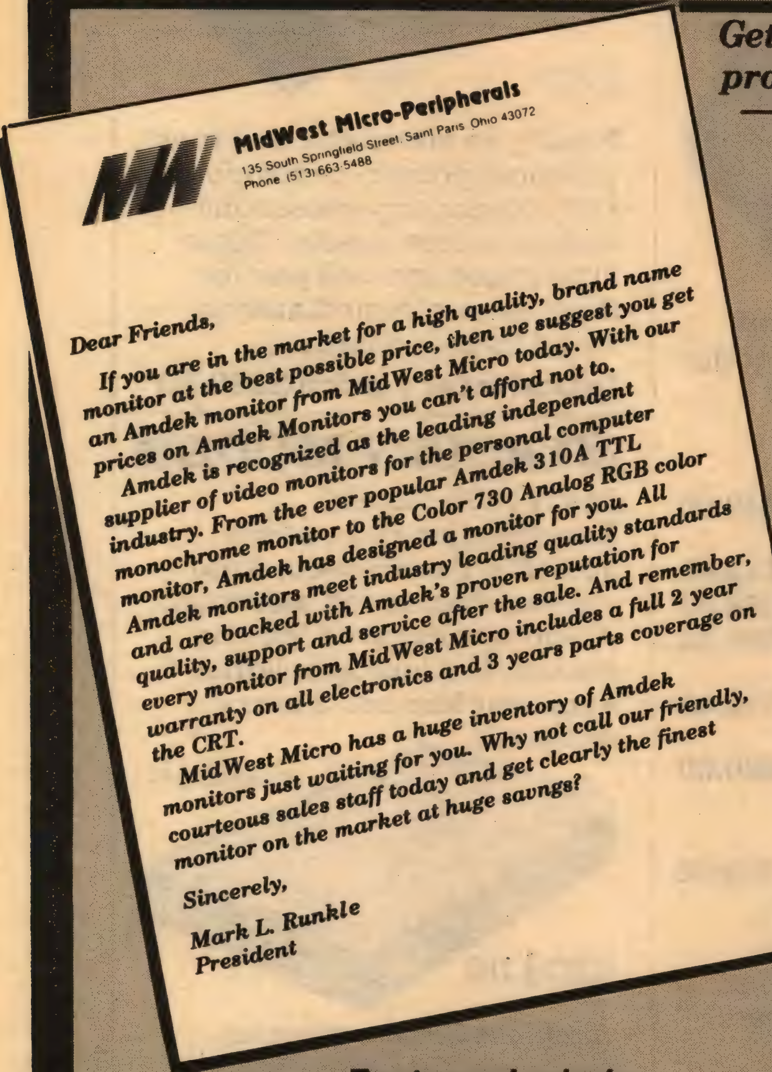

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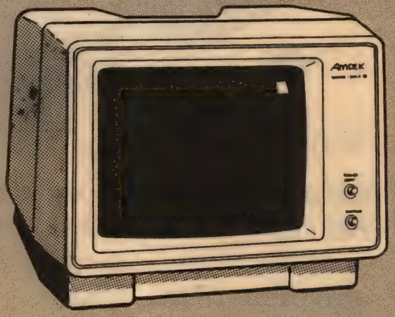

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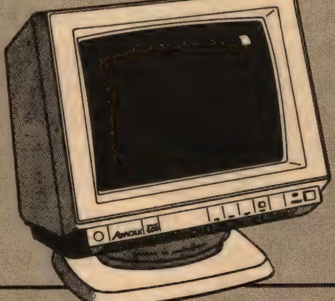

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NEC MultiSpeed: The Fastest Laptop Yet

by Barbara E. &
John F. McMullen

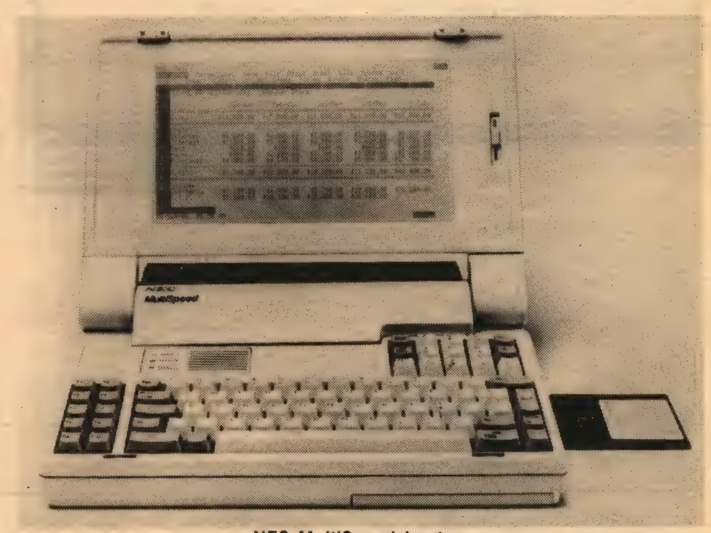
On November 5, 1986 at New York City's "Tavern On The Green," NEC Home Electronics (U.S.A.), Inc. introduced the MultiSpeed, a laptop computer which NEC bills as the fastest laptop presently available. Based on NEC's "V-30" microprocessor, the MultiSpeed operates at both 4.77 MHz and 9.54 MHz and utilizes the MS-DOS 3.2 Operating System. (NEC states that it is also fully compatible with earlier versions of MS-DOS.)

The standard system is 13.6" x 12" x 3", weighs less than 12 pounds (including NiCd battery) and contains 640K of RAM, 512K RAM, two 3½ 720K disk drives, an RS232C serial port, a standard parallel printer port, RGB video interface, a detachable 80 character x 25 line LCD screen with 640 x 200 pixels, 85-key keyboard with separate numeric keypad, AC Adapter, line and telephone ports. The price of the standard system is $1,995.00. Options for the system include a 300/1200 Hayes compatible modem—$399.00, PC Data Transfer System (Cable to connect to Desktop 5¼ Disk Controller & program diskettes for both Desktop and MultiSpeed) $99.00 and Carrying Case—$89.00.

The 512K RAM, standard with the system, contains built-in "window" based firmware which provides Sidekick—like functions for communications (including VT100 & VT52 terminal emulation and support of XModem protocol), Outlining, Notepad, Filer and Automatic Dialer. These functions may be activated from within application programs by the use of a pop-up key and allow return to the interrupted program at the conclusion of the activity. The pop-up key can also be used to activate the Setup utility which permits the user to control clock speed and disc and screen parameters. In describing the built-in programs, Computer Products Manager James Bartlett says, "The programs make it accurate to describe the computer as a portable briefcase. In addition to MS-DOS 3.2 and XT-compatible ROM-BIOS, we have provided all of the tools to make the MultiSpeed a truly useful machine for conducting business on the road."

The MultiSpeed operates as a portable using the built-in rechargeable NiCd battery or as a fixed location unit utilizing the AC Adapter. The NiCd has a useful life of 4-6 hours and recharges while the AC Adapter is in use.

In announcing the MultiSpeed, Gary Morris, assistant vice president for Marketing of NEC's Computer Products Division, made it clear that NEC feels there is a developing market for laptops and that NEC's entry places it at the forefront of this emerging market—"Portable PCs comprise only about 3% of the market, yet this is the area of greatest potential growth. Forecasts for laptop sales show an increase to 2.0 to 2.6 million sales by 1989." To determine how to reach this market, NEC relied extensively on the desires of present and potential laptop users who it canvassed through the formation of focus group type panels. Morris reported that the most important points to these groups were, "PC Compatibility, faster operating speed, more memory than units currently on the market, more extensive built-in software, light weight, priced under $2,000.00." Morris feels that the MultiSpeed provides the answer to the stated needs of these users. "The challenge was laid down and after months of research, development, refinement and hands-on testing, the MultiSpeed emerged. It was the marketplace that told us what it wanted. We're looking forward to seeing how the marketplace responds."



NEC MultiSpeed Laptop

The reliance on market research was evident when we questioned Marion Black-Ruffin, NEC's manager of marketing communications about the absence of a hard disk option for the MultiSpeed. "Our discussions with our research groups led us to understand that the battery life of the NiCds was more important than the inclusion of a hard disk that would greatly decrease battery life." The above—quoted Jim Bartlett also referred to NEC's use of market research. "Just as we used comprehensive market research and focus groups to help us design the MultiSpeed computer itself, we also asked them to describe the built-in software programs they most wanted. These end-users' conclusions have resulted in the most extensive and useful firmware package presently available in a laptop model."

While we reserve final judgment on the system until we have the opportunity to work with a unit for a while, the MultiSpeed's speed and price certainly make it an interesting entry into the market.

●

80386 Computers Star At Comdex

by Rich Fields

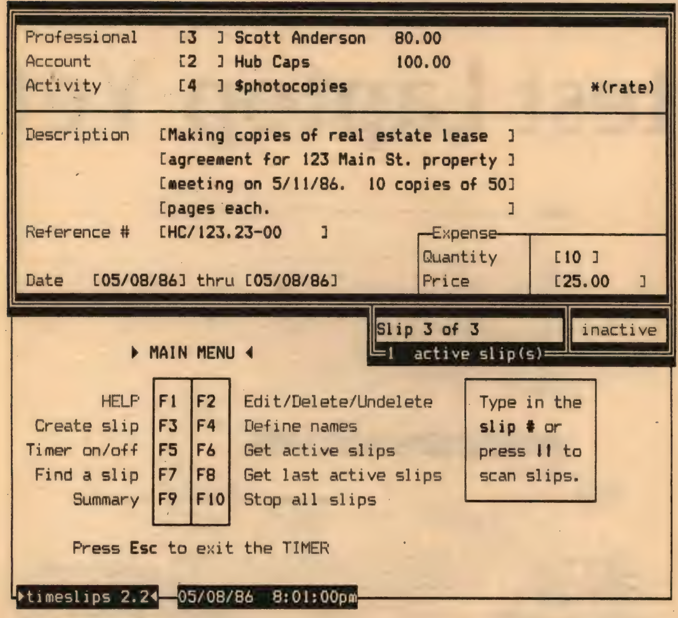
It is a tradition at each Fall Comdex held at Las Vegas that some type of computer hardware play the part of the show star. This is getting harder with each passing year because some of the major computer manufacturers do not introduce their new products at major shows and in fact do not even show up for all the shows. At the 1976 Fall Comdex, Apple Computer and Commodore were conspicuous by their absence. IBM was there with a booth that looked for all the world like a fortress. They showed nothing really new, although the industry longed for them to "drop the other shoe" and introduce a 80386 based computer. In spite of the non-appearance of the expected IBM entry, the 80386 CPU was the "Star of Comdex." Ever since Compaq introduced the 80386 Deskpro series of computers a few months ago, the industry has waited to see what would happen. Would Microsoft an-

continued on page 96

Compaq 80386 Deskpro Computer

Timeslips

by John J. Anderson



```
Professional    [3  ] Scott Anderson    80.00
Account         [2  ] Hub Caps          100.00
Activity        [4  ] $photocopies                          *(rate)

Description   [Making copies of real estate lease  ]
              [agreement for 123 Main St. property ]
              [meeting on 5/11/86.  10 copies of 50]
              [pages each.                         ]
Reference #   [HC/123.23-00    ]          ┌Expense─────────────────
                                          │Quantity  │  [10 ]
Date   [05/08/86] thru [05/08/86]         │Price     │  [25.00    ]
                                          Slip 3 of 3           inactive
             ▶ MAIN MENU ◀                1  active slip(s)

        HELP  F1  F2   Edit/Delete/Undelete      Type in the
 Create slip  F3  F4   Define names              slip # or
Timer on/off  F5  F6   Get active slips          press ↑↓ to
 Find a slip  F7  F8   Get last active slips     scan slips.
     Summary  F9  F10  Stop all slips

     Press Esc to exit the TIMER

▸timeslips 2.2◂─05/08/86  8:01:00pm
```

"Expense-slip" - expense record

If you are a consultant, freelance writer, lawyer, accountant, or professional in any field—and you bill time to customers—you know how difficult that can be.

Enter Timeslips, the first memory-resident time and billing system to include its own report and graphics generators. Timeslips allows you to track your time and expenses with "pop-up" (memory-resident) stopwatch screens, or enter time and expense information from your records. With it, you can prepare customized bills with user-definable billing phrases and "aged" receivables. You can also generate several types of business and financial reports and graphs.

Timeslips performs most of the functions of much higher-priced time-logging software—with a few limitations. It is fast, efficient, and practical.

Other main features include on-line help and a menu-driven format that makes the program easy to learn and easy to use, and a selectable password system and keyboard lock which provide office security for private information.

This $99.95 package, which runs on any IBM PC/XT/AT or compatible and does not require a graphics card, is produced by North Edge Software Corp., a Massachusetts-based company specializing in software products that enable businesses to increase profitability through tighter control of their day-to-day operations.

Timeslips is well-suited to all professionals who bill or track their time, such as lawyers, accountants, computer consultants, systems analysts, public relations and advertising staff, and service organizations. Manufacturers can use Timeslips to track machine usage, and business services companies can use the software to keep tabs on employee time.

When Timeslips is used as a memory-resident program, it pops up over other programs at the touch of a key. This lets users access TimeSlips (to time a phone call, for example), and then resume their work (word processing, financial analysis, using on-line services, etc.) at exactly the point they left it.

Timeslips can track up to 240 users or operations simultaneously, and keep up to 32,000 individual time or expense records per directory.

Timeslips TSTIMER module records the time users take to perform various activities, and records expenses incurred. TSTIMER is used to enter time usage from a company's existing paper forms, and/or is used as a stopwatch to time events as they happen.

This module may be set up to run in either foreground or background mode. In background mode, the program resides in memory and is available for use with other application programs just by pressing the user-assigned "hot key." This immediately pops Timeslips up over applications programs without disturbing them in any way. In foreground mode, TSTIMER runs like any other applications program, and can run within multi-tasking or windowing environments.

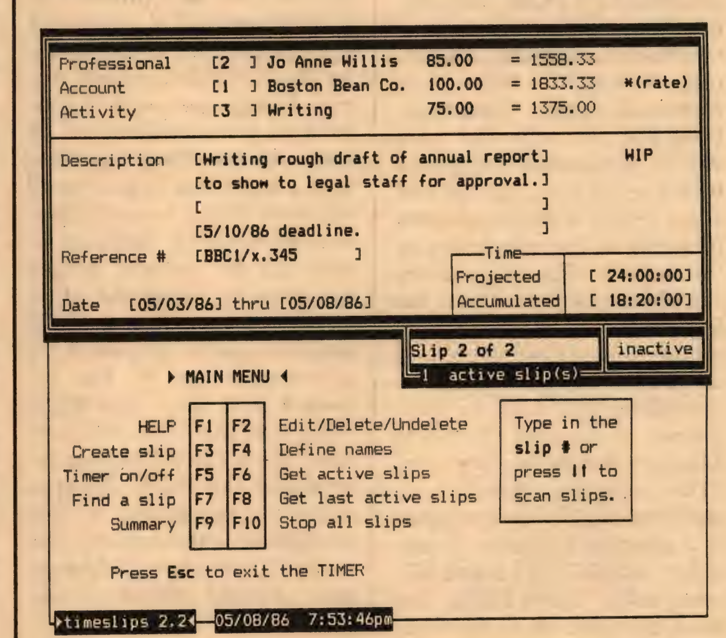
On each actual timeslip (Timeslip's automated time record) users can specify the following:

Headings—These are the categories of who did the work ("User"), who the work was done for ("Account"), and what type of work was performed ("Activity"). You may change the pre-set headings on the timeslip to fit their profession or application—for example, "Lawyer," "Client," and "Matter," or "Accountant," "Client," and "Activity." Users may enter data into these three fields by selecting names/codes from a menu, or by typing them in.

Descriptions—Each timeslip provides four lines of 36 characters each for users to further describe the work they performed. Users may choose to have only the first three lines of description appear on bills, so they can use the last line for internal purposes.

Reference codes—Reference

continued on page 136



```
Professional    [2  ] Jo Anne Willis    85.00    = 1558.33
Account         [1  ] Boston Bean Co.   100.00   = 1833.33   *(rate)
Activity        [3  ] Writing           75.00    = 1375.00

Description   [Writing rough draft of annual report]          WIP
              [to show to legal staff for approval.]
              [                                    ]
              [5/10/86 deadline.                   ]
Reference #   [BBC1/x.345      ]          ┌───Time──────────────────
                                          │Projected    │ [ 24:00:00]
Date   [05/03/86] thru [05/08/86]         │Accumulated  │ [ 18:20:00]
                                          Slip 2 of 2           inactive
             ▶ MAIN MENU ◀                1  active slip(s)

        HELP  F1  F2   Edit/Delete/Undelete      Type in the
 Create slip  F3  F4   Define names              slip # or
Timer on/off  F5  F6   Get active slips          press ↑↓ to
 Find a slip  F7  F8   Get last active slips     scan slips.
     Summary  F9  F10  Stop all slips

     Press Esc to exit the TIMER

▸timeslips 2.2◂─05/08/86  7:53:46pm
```

"Timeslip" - time record

80386 Computers continued from page 95

nounce a version of DOS supporting all the features of the new 16/32-bit CPU? Would IBM come out with a new personal computer based upon the 80386? Would the new IBM machine, if it came out, have a proprietary DOS, or run on Unix (or Xenix), or what?

Every other manufacturer said that Compaq was playing a dangerous game coming out with a clone before the original was released! That is assuming that IBM sets the design and everyone else must follow. Compaq has never believed that, this is not the first time that they have lead IBM to the market. They after all came out with a transportable PC, the IBM model is really an inferior Compaq clone.

Be that as it is, when the Comdex show opened, every large manufacturer (and some small ones) had a 80386-based AT clone on exhibit. In addition many board manufacturers such as Quadram had a plug-in board that coverted either an XT or AT into a 80386 Turbo computer. Even some of the do-it-yourself motherboard vendors were offering 80386 motherboards to replace your AT board when you felt the need for upgrade.

There was nowhere you could go at Comdex without being pulled into booths to see the latest in 80386 hardware. However, when you expressed an interest in getting one of the new super terrific 80386 computer or boards to review for a major article in our magazine, they tried to divert you and offer you their XT or 80286 AT in place of the new machine.

By a little investigative reporting, this reviewer found out that Intel had supplied sample chips to all these manufacturers but there was yet no second source and the yield of good chips was very low. To those of you who do not realize what this implies, let me tell you about the workings of the computer industry.

When a new chip is developed, the chip manufacturer wants to get it into the hands of as many computer makers as possible, because it must preempt competition from other chips. Once a manufacturer develops a line based upon a chip family, it is almost impossible to change. This is because all his related processes revolve around the CPU and related software. Very few manufacturers have the resources to use Intel and Motorola CPU families, they stick with one or the other. The 6502 users like Apple found it more familiar to use the 68000-family when they went to 16-bit and larger than go to the Intel family.

When a chip is first produced, the yield of good chips to come out of the pot is very small. Their cost would be prohibitive except that the chip maker absorbs most of this as part of the development cost. These are the engineering samples distributed to computer manufacturers to incorporate into the new models. Getting their chips adopted is a life and death matter for the chip makers and they supply every type of engineering support needed.

Using the right chip is also a life and death matter for the computer manufacturer, if he invests his new model in the wrong CPU, it may end up as one that has no software support and even cost his business. For this reason most manufacturers look for a chip that has several sources. It is common practice for chip makers to license their product to other chip manufacturers. This means that both the chip maker and computer manufacturer do not have all their eggs in one basket. The second sources like to wait until the new chip is an apparent winner and until all the bugs are out of the manufacturing process.

Why am I telling all about this dangerous game? Just to back up my claim that most of the new 80386 AT-type computers starring at Comdex will never be seen again! Or at least not until the software operating question is settled.

Let us look at the operating system problem as it exists for the 80386 computers. First back in the ancient days of personal computing the 8080 and Z80 CPUs were the major chips in use. They were 8-bit chips used in CP/M (and TRSDOS) systems. Like all 8-bit CPUs they could only directly address 64K of RAM and they had other speed and storage capacity problems. Intel then developed the 8086 CPU, this is a true 16-bit microprocessor with the potential of addressing megabytes of memory and being operated at high clock speeds. A version of CP/M was developed to run with the 8086 but there were very few machines whichever used this chip.

When IBM developed the PC, it did not choose the 8086 because this would have required 16-bit wide memory and much more complicated I/O, graphics and video. Instead IBM selected the 8088 which runs the 8086 instruction set but does it in an 8-bit bus. This only required 8-bit wide memory and also permit-

continued on page 130

TANDY COMPUTERS

TRSCROSS Disk/File Transfer Utility

by Stephen B. Gray

Suppose you have an IBM PC (or one of its clones on your desk at work, and you'd like to run some of your TRS-80 programs from home. Or perhaps you don't have a TRS-80 any more, but you'd like to use all those programs you spent so much time writing or copying, and the only machine available to run them on is a PC.

Not long ago you'd have been out of luck. But now, with the unique TRSCROSS utility from PowerSoft, you can read your TRS-80 floppies on a PC, and copy files in either direction. To be more specific, you can copy to or from a TRS-80 floppy, format or purge a TRS-80 floppy, or display the directory of a TRS-80 floppy, all on a PC, without having to use the TRS-80 at all.

Using TRSCROSS couldn't be simpler. Just put the TRSCROSS disk in drive A, type A: TRSCROSS <Return>, and go.

TRSCROSS usually operates from the main menu, with six choices:

1—Copy from TRS-80 diskette
2—Copy to TRS-80 diskette
3—Format TRS-80 diskette
4—Purge TRS-80 diskette
5—Display Directory
6—Exit

An unlisted menu choice, 7 or F7, displays a color map and lets you enter whatever color choice you like.

To copy from a floppy, start TRSCROSS, put a TRS-80 floppy in the first drive, press <Return> three times, and you'll be reading the TRS-80 floppy using the built-in defaults. The floppy is analyzed to determine the DOS type, number of drives, etc. If that's successful, the entire directory is read into memory and displayed, with mode flags.

TRSCROSS copies all files that have some type of mode displayed. If you don't want to copy all the files, just press the N key (for NO COPY) next to the files you want to skip. If the P (protected) flag is displayed, the file will be marked as read-only when copied to the PC. A password is not necessary, and the status can be changed using the ATTRIB command from DOS.

Four copying modes are offered: ASCII, binary, BASIC, and Supers. This last one is for transferring SuperScripsit files. Although the manual doesn't mention it, TRSCROSS also copies Scripsit files.

As the manual notes, some TRS-80 floppy files "are not appropriate for moving." For instance, any machine-language programs would almost always be useless on a PC. Such files do not show a mode listed; the space for mode is blank, meaning they will not be copied. Also, as you might suspect, you can't copy PEEKs, POKEs, or graphics.

Pressing the space bar toggles through the four modes, which can also be chosen directly via function keys. Pressing <Return> will copy the files as selected. A "Help" line at the bottom of the screen shows which function keys do what.

As an example of the thoroughness of the TRSCROSS utility, you can sort the directory from the highlighted file through the end of the list, by Date, Extension, or Filename. This sorting is done in memory only, and doesn't affect your floppy at all.

Once you start the copying by pressing <Return>, the utility asks one more question: which drive and directory do you want to copy the files into?

Any time you want to stop the copying, just press <Esc> and it will halt after the current file is done.

Copying to a TRS-80 floppy is almost the same as copying from one. You'll be asked if you want to see ALL the files in the directory, or a select group. You can select by extension, such as .BAS, to copy all the Basic files. Or you can copy all the files beginning with A, etc.

The four modes are available for copying in this direction, as is sorting the directory. Again, the copying doesn't change your PC/MS-DOS files at all, because they are opened in read-only mode.

Formatting a TRS-80 floppy prepares it for TRS-80 files, so it can be used by TRSCROSS or by the original TRS-80 system. You specify the drive (such as 0 for the drive usually known as A), the cylinders (usually 40, sometimes 35 for special cases), and sides (1 for single-sided). If you answer to "sides" was not 2, you'll be asked which type of format you want, TRSDOS 6/LDOS, or TRSDOS 1.3. The first one is the default choice. The second one prepares the floppy for the Model III TRSDOS operating system. The question is not asked if a double-sided format is requested, because TRSDOS 1.3 doesn't support double sides.

If you want to format a TRS-80 floppy for another system, such as MultiDOS or DOSPLUS, select TRSDOS 6/LDOS, which should be data-compatible.

Purging a TRS-80 floppy deletes files. For instance, if you format a floppy and copy many files to it, you may realize you didn't want to copy one of the files. It's easier and faster to purge that one file, than to format and copy all the others again. The file is only marked as deleted, so the information can still be recovered by a program like Super Utility+ for the TRS-80 computer.

When the select screen appears, you place the cursor on the file you want to delete, and press Y. Because the default for all files is to not purge, pressing <Return> to begin the purge will delete only the files you marked with a Y, when writing to a new floppy.

The Display Directory function is useful whenever you want to look at a directory without using any of the other functions. Free space is also displayed.

To look at system and invisible files on a TRS-80 floppy, start the program by entering TRSCROSS /I /S <Return>.

The 27-page manual is excellent, written simply and straightforwardly, and covering all the bases. Each function is discussed fully. The manual ends with three appendixes, explaining the ten error messages and the TRS-80 floppy format, and answering some common questions.

Following the manual, I put the TRSCROSS disk in drive A, keyed in TRSCROSS, and got the main menu. I took the TRSCROSS disk out of drive A, and replaced it with a TRS-80 disk. It was very easy to read the directory of the TRS-80 disk, and to format a blank disk in drive A.

But when I tried to copy from the TRS-80 disk in drive A, the screen displayed "Drive (default 0)" and would go no further.

So I read the manual again, and found the answer. You can't read a TRS-80 disk from the same drive you use to read the TRSCROSS disk. There has to be a "destination path" which "refers to the drive and directory that you desire to copy the files into."

So I set up a temporary file in drive F (a hard disk), copied TRSCROSS to that file, then copied a TRS-80 file from drive A to drive F. It was a Scripsit file, in ASCII, and all I had to do with it, when reading it with WordPerfect, was to add the required soft returns at the end of each line, which WordPerfect does automatically.

Then I copied some files onto a disk I'd formatted with TRSCROSS, checked with the

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CoCo 3 —Alive On Arrival

by Michael Wafkowski

After more than two years of wild rumor and speculation the wait is over and the CoCo 3 is on dealer's shelves. It's an amazing package when you consider that the retail price is $199.95 (catalog #26-3334). Tandy just dropped the price from $219.95. The 64K CoCo II is now $99.95.

I'm now sitting in front of my new CoCo 3...It'll take a while for me to get used to the idea of working with a machine that looks like a CoCo 2, with the exception that it is displaying extremely readable 80 column text on a color monitor. This thing is great! The colors on the $299.95 analog RGB display (Catalog #26-3512) are outstandingly deep and rich.

Secret Stuff

Psst. Wanna know a secret? If you hold down the CTRL and ALT keys on the new CoCo while you hit the reset button, you'll be greeted with a surprise. Next month, I'll let you know what you're looking at.

Late, As Usual

The CoCo 3 is almost ten weeks late being delivered to these shores from the Orient, partly because they were tied up by customers for three weeks instead of the usual few days. Then they all arrived at once at the Tandy warehouse backing up the system and causing further delay. They are available at local Radio Shack Centers.

If you can't afford the $300 for the RGB monitor you can use any composite monochrome monitor. At the end of this column I have a short basic listing that will clear up the 80 column monochrome display and give you very sharp text. But I must goad all CoCoists...save your dollars and dimes. You won't get the full impact of the CoCo 3 without the color display.

Listing #1

This short basic program will enhance your CoCo 3 display on a monochrome monitor. My thanks to Jim Bellaire for his upload to Compuserve.

```
1 'FR 73177,1452 JIM BELLAIRE
2 'LINE 10-15 GIVES A CLEARER
3 '   PICTURE - NO COLOR INFO
4 '   ON THE WIDTH 32 SCREEN.
5 'LINE 20   GIVES AN INVERSE
6 'SCREEN - WHITE ON DARK
7 'ON WIDTH 40,80 SCREENS
8 'FOR A CLEARER WIDTH 40/80
9 'REGULAR SCREEN, TYPE CLS5
10 FORX=0TO7:READC:PALETTEX,C:
NEXTX:PALETTE13,63
15 DATA 0,16,32,48,32,16,0,0
20 PALETTE0,0:WIDTH40:CLS1:ATTR3,0
30 'THANKS TO CLAY HOWE FOR
31 'THE USE OF HIS COCO3 IN
32 'WRITING THIS PROGRAM.jb
```

Software Blues

I bought my CoCo 3 at the Rainbowfest in Princeton, New Jersey. (Princeton Rainbowfest is one of several Color Computer shows held around the country each year and sponsored by the *Rainbow* magazine and a must have for any CoCoist). The real bummer of the show was that there was almost no software exclusively for the new machine. Bob Rosen of Spectrum Products was kind enough to give me a copy of "C III Graphics" which is a simple drawing program written in BASIC. The

continued on page 189

CoCo 3 Another Opinion

```
KEY CODES FOR THE COCO 3

  FOR PATCHING INTO
  YOUR OLDER PROGRAMS

 CTRL     189
 SHIFT CTRL      1
 ALT     64
 SHIFT ALT     19
 CLEAR      12
 SHIFT CLEAR       92
 BREAK      3
 F1     103
 SHIFT F1      52
 F2    4
 SHIFT F2      214
 UP ARROW     94
 SHIFT ARROW       95
 DOWN ARROW      10
 SHIFT ARROW       91
 LEFT ARROW      8
 SHIFT ARROW       21
 RIGHT ARROW      9
 SHIFT RIGHT ARROW       93
```

by Robert Fink

I've felt for the last four years that the Color Computer by Tandy was a computer "waiting to happen." Now that the CoCo 3 has arrived I think I was right. The CoCo 2 was more than the game machine Tandy sold it as, but it lacked:

1. Real high-res color via a monitor output. Especially true lower case, 80 character text display.
2. Easier memory expandability.
3. Serious third party software using point and pick methods.

I ordered the new CoCo 3 when they were announced and have evaluated past compatibility with the CoCo 2 and fulfillment of the future needs. Here's what my preliminary "hype-less" impressions are.

Compatibility With Existing Hardware & Software

The best way to check the compatibility claim is to drop the three right into the place of a CoCo 2 and replug the components on to it. I found that my Tandy hardware (disk drive, cassette, etc.) was indeed still usable. The use of a TV as the monitor will not allow readable text in the 80 character hi-res text mode but I was after a monitor machine anyway. At the price of the CM-8 Analog RGB monitor this will still turn out to be a well priced combination.

Next I began to check out various Tandy programs I own. My drive clunked away on startup so I knew the same old "head banger" bug was still in RSDOS ROM!! BASIC programs are, of course compatible. There's still only the 22K or so bytes left for straight BASIC as usual. I fired up my favorite RS game "Ghana Bwana" but the copy protect loader won't bring the rest of the code in! Other games such as Pitfall II and Zaxxon worked fine. Oh well, I didn't buy this one for a game machine!

I fired up OS-9 as it seems to be the DOS Tandy will support for future developments. Version 01.00 wouldn't load but we were told to upgrade to Version 02.00 six months ago and it runs fine. If you see sales on OS-9 now watch out for the old version. This is academic anyway as Tandy has promised a Level II version which will support windows and really get the ball rolling. In the meantime I found I can still run my word processors (VIP Writer and XWORD) with no problems. The only other piece of Integrated Software I own was Deskmate and it seems to run OK

Next was a try at Assembly language. EDTASM wouldn't load in previous disk source files. I imagine some slick patches will come along to fix that. In the meantime I guess it's the OS-9 assembler for doing machine language.

One interesting change is that the machine runs a lot cooler because of redesign. That's got to be a plus for anyone who has hung extra components on.

Evaluating The New Stuff

There are now hi-res text (40 & 80 wide). When using the 40 wide the screen clear is different so old programs behave OK but leave junk on the screen in these modes. Still this professional text mode is sure what this machine has needed. The new high res Graphics (H commands in BASIC) will rival any BASIC graphics ability I've seen even in the "biggies." The keyboard is from the latest CoCo 2 and will take some getting used to. It does finally have a Control and Alt. key so some patches to existing software to use the Ctrl key will be a first priority. Two function keys are available and I've included a chart of their ASCII values so some of your application programs can begin to be more "user friendly."

It looks like this machine has finally caught up. Now for some "ifs" that would really allow the CoCo to capture new sales the way Tandy computers once did. They are:

1. If Tandy will bundle it as a system with a hi-res monitor and disk drive at a good package price then "software hungry" users would appear. That would allow third party software (which Tandy finally acknowledges) to take advantage of the system's real capabilities. With good properly priced programs around the users would continue to spend money like the "Commodore" people used to do. But, if Tandy continues to market it as a $199 game box than after a couple game sales it will go into most closets.

2. If an operating system in ROM with full screen editor and windows, somewhere between RSDOS and OS-9 comes along, it could quickly become the standard for the CoCo. Past compatibility wouldn't be essential if it would offer new full capabilities of the hardware.

3. If language support for education comes along (Pascal with complete teaching packages, "C," Assembly, etc.) another on-going market could be regained. Schools can't shy away forever from an inexpensive system if it is complete with software packages that stand on their own!

Some Final Thoughts

Looks like Tandy and those of us who stuck with them have a potential winner. Just as the 64K CoCo 2 was a real "sleeper," this new machine at $199 could be the best buy around for years to come. Couple the 6809 chip with its relocatable code ability, programmable interrupt, RS-232 and 2 Analog/Digital ports, Composite Video and Analog RGB and no one else in the middle range can touch it.

It's a wise shopper who could at least look at this one.

●

The Drive M: Loader

by Franklin Reid

One of the best things about using "older" computers is watching them mature into first-rate machines. The same is true of their software and operating systems.

The Radio Shack TRS-80 is certainly a good example. The Model 4 (Desktop, 4P or 4D) has the capacity to perform just about any function required by any computer, including mainframes. Notice I did not say that it would run any software but I meant that it will do any of the tasks for which computers were invented.

This includes financial spreadsheets, typing of any kind, accounting tasks, drafting (CAD), creating and managing files of data—in short it can hold its own with any computer in the world for getting the job done.

Never mind that my own consulting business is based squarely on the PC/XT/AT and compatibles. I do all of my letters, reports, spreadsheets, accounting, etc. on my trusty Model 4P.

I enjoy hearing many owners of other machines argue that their particular 16 bit computer is superior to any ol' 8 bit machine. I ask them to show me a letter written on their computer; then I show them one written on mine. They really can't tell the difference because the bottom line is the printed page, itself, and not the brand of the computer. The same is true in all other areas of computer work.

Of course, the other machines have the ability to hold more of a given document in RAM than the 8 bit computers, and they will run at a faster clock speed (noticeable only with very large documents), but with the latest 8 bit technology, even that is changing.

An experienced worker using SuperScripsit and Little Brother will get the job done just as good (and often just as fast) as another using Word Perfect and RBASE.

Thousands of users of the Radio Shack Model 4 have made great use of the many programs available for the TRSDOS operating system. With SuperScripsit, BASIC and VisiCalc, which I purchased with my model 4P about two years ago, I can do nearly anything I need to. But it just keeps maturing and getting better.

Late last year I obtained the excellent version of CP/M 2.2 from MonteZuma Micro (MM) and have since changed all of my work over to WordStar and dBASE II. I really can't say enough for this useful tool.

It's not that CP/M is so much better than TRSDOS (some think it's not), but that MonteZuma Micro's user interface, written by Jesse Bob Overholt, has so many features to help the user customize the CP/M operating system to his or her own way of working. Not only does it help in both WordStar and dBASE II but in all other applications which run in the CP/M environment.

If you have this software then you probably already know that there are a number of slick utilities in MM's CP/M which, when used together with the extra 64K memory bank (called a RAM disk or memory drive), can add so much to the ease and flexibility of the application programs; and they require no programming or "hacking" experience. Just select the items from the menus and the program does the rest.

What I'd like to share with you is a way to create a "loader" disk which will speed up your use of these utilities by putting them all onto the memory drive. What we're going to do is copy (PIP) the utilities onto a freshly formatted disk. Then, SYSGEN onto it the instruction to start up and begin copying the contents of the disk onto the memory drive, called drive M:.

Later, when you wish to begin a session that will require these utilities, you just insert the DRIVE M: LOADER disk into drive A:, turn on the computer (or push RESET) and in a few moments (17 seconds on my 4P) the drive M: is loaded with all your utilities, ready to work for you without typing any other keys whatsoever! Now you can remove the disk and both drives A: and B: are available for other things. One warning is in order. Remember that once the drive M: is in RAM, it will be wiped clean if you RESET again.

To make this handy disk, place your CP/M disk into drive A: and a formatted disk into drive B: and turn on the computer (or push RESET if it's already on). If your computer has the extra 64K bytes of memory installed, your screen should show the CP/M banner followed by the words:

```
>>>Memory Drive M:
ENABLED
```

Unlike TRSDOS, which requires a lengthy string of command data just to enable the memory drive, MM's CP/M does it automatically. Of

continued on page 190

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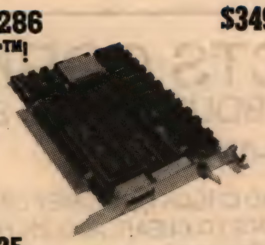

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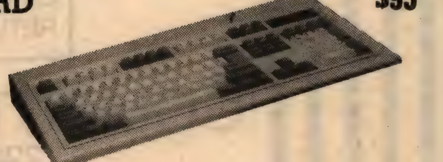

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APPLE

Ask The Guru

by Don Lancaster

Let's see. Just where did we leave off last time? There are bunches of news and rumors this month, so let's have at it.

Congratulations to Lynette Schnebly of Tucson, who has newly broken the all-time Macintosh high score by managing to get the bomb icon to appear 4,671 times in a single marathon Mac work session. Using the knockout combo of MacDraft, AppleTalk, and the LaserWriter Driver all together, of course.

Even if you can't enter such world class competition, there is a new and top secret Mac program that you probably will want to know about. It is called Passport, and instantly lets you convert most any IIc/IIe/IIgs file to most any Mac file in either direction. Including word processor files, Appleworks stuff, even EDASM assembly listings.

There are a few gotchas, though. First, the program only runs on the Mac side and then only with a Mac plus and a hard disk. And, secondly, you have to work with 3.5 inch disks so they will fit into the Mac drives. Finally, early versions are very buggy and blowup prone.

At this writing, the release of Passport is still hush-hush. So, you'll just have to inquire through the usual sources for your copy.

Try the gold channel with a R2 priority, using a KNOCKWURST. ALA.KING password.

Five minutes after the deadline for last month's column, Apple dropped the price of their LaserWriter by $1000. Naturally, nobody would have the unmitigated gall to quote you the Apple list price of $4995. The LaserWriter street price is now somewhere around $3450 if you shop around carefully enough.

What's the story on the LaserWriter plus? The only difference between a LaserWriter and a LaserWriter plus are eight missing EPROMS. These EPROMs give you a few extra and interesting fonts, but the yield and service problems on these chips has been an absolute disaster for Apple to date.

Since these chips are both ridiculously overpriced and in fact undeliverable, sets of bootleg LaserWriter plus EPROMs are showing up in many larger cities at costs of $95 or lesss. Naturally, you can clone your own for around $35 if you have a big enough EPROM programmer.

There's one thing that needs the record set straight on this, though. Apple's claim that the plus chips are required to download fonts is simply "that which is not so." You always had the ability to download any custom, low priced, and unlocked fonts from any source on any LaserWriter.

The new chips now give you the additional ability to download overpriced, single sourced, and highly protected fonts as well.

Speaking of laser printers, did you see where HP shot themselves in both feet at once this time? The LaserJet always has been a hopeless cripple compared to the LaserWriter, since it lacked full screen, full resolution graphics, a useful page description language, the any-size-at-all procedural fonts, cubic splines for smooth curves, flexible scaling, rotation, and translation transformations, and freedom from font cartridge ripoffs, to mention a few of the more obvious defects.

Rather than go with the industry standard Postscript page description language that would eliminate all these hassles in one swell foop, HP chose an obscure and arcane page description language from so far out in left field that it does not even provide for procedural fonts. And the ultimate kicker is that, at least for now, this language has to reside in the host and not in the printer.

Dumb.

One bright side to all this, though. There is nothing that anyone, anywhere could have conceivably done that would more positively and more absolutely guarantee Postscript gaining its well-earned place as the industry standard page description language.

Thanks, HP.

But this month's ultimate laser printing sick joke is that someone introduced a new high end laser printer with an internal 48 megabyte hard disk. The only little problem is that the operating system was written in UNIX, and it was so bloated that there was absolutely no room left in the 48 megabytes for a user program or application!

Rumor has it that the next generation LaserWriters will appear sometime this spring.

Expect an under-$2000 four page per minute Postscript speaking personal laser printer using the Ricoh (Savin) engine, and a deluxe high end version with zillions of built-in fonts, a fast 32 bit microprocessor, a two page memory, and all sorts of other neat stuff.

At, of course, a neat stuff price.

The software compatibility percentage for the IIgs continues to fall dramatically.

One recent casualty is the Imageworks card, since a three cent internal video connector was left off the IIgs.

Even AppleWriter has its problems. If you want to run stock ProDOS AppleWriter on a IIgs, the simpliest way to do it today is by providing your own super serial card instead of internal serial firmware.

I've been working on patches for IIgs AppleWriter, and should have them for you shortly.

I'll be publishing the bare bones essentials here, while Don Thompson of Thompson & Thompson will add them and many more to his already excellent new utilities.

The new patches are an absolute joy to use. In fact, I'm temporarily back on my IIe and it feels like I am working in a tank of molasses. The fastness and smoothness is almost unbelievable, particularly on searches, WPL routines, long deletions and [A] screen formatting. The immediate availability of time and date and a humongous RAM disk are even better.

But the best of all is the built-in print buffer that lets you almost immediately return processing words while your printer goes merrily on.

This is particularly important for LaserWriter error messages. Except for AppleWriter on a IIgs, very few word processors anywhere have a true full duplex built-in telecommunications capability, despite the urgent need for this feature in desktop publishing.

You also now have Appletalk resident and on-line, so you can network AppleWriter with other computers and other printers.

Some free patches on much of this, hopefully, right here next month.

Apple's new IIgs memory expansion card seems to have some interesting thoughts behind it. It is a very conservative, very low cost design, created by removing parts from the older slot 1-7 based IIe RAM card. It uses older 256K individual chips, rather than going the cheaper, smaller, more reliable, and more obvious route of using plug-in SIMM modules.

At $129, the pricing is very aggressive. The apparent reason for the older memory technology is so that IIe owners won't be totally hacked off when they find out their older third party memory cards will not fill the IIgs. At least you can move ¾ of the chips from your old card to the new one.

I'm still not fully happy with Omnicrom full color performance on the LaserWriter, both because of reliability and wrinkling problems. Seems I was at an auction and lucked into an old beastie called a Viewfax Model six. The cost was $6, which is some $1294 cheaper than the Omnicrom fusion machine. I don't have the slightest idea what this machine was intended for, but it works beautifully as an Omnicrom fuser.

The message here is that there are probably all sorts of obsolete office machines and broken copiers scrounging around that could be easily converted into suitable Omnicrom fusers. What you need is two powered rollers and a temperature somewhere around 170 degrees C.

Let me know if you can beat the $6 price on this.

Where Are The Low Core Utility Entry Points in Appleworks?

As part of its booting process, Appleworks loads a

continued on page 102

Colossus Chess IV Popular Computer Chess Program

Colossus Chess IV, an outstanding computer chess program for the Apple II Series and Commodore 64/128 computers, is attracting a huge following of loyal fans, according to numerous recreational software reviewers across the country. Colossus Chess IV is a recent release of Firebird Licensees, Incorporated, a wholly-owned software publishing subsidiary of British Telecommunications PLC. (U.K.) with U.S. operations headquartered in Ramsey, New Jersey.

Colossus Chess IV's popularity is attributable to several of the program's outstanding features, most notably its in-depth understanding of such esoteric tournament rules as the difficult King, Bishop and Knight versus King mates. Underpromotions, the fifty move rule and all draws by repetition are also understood and considered by this advanced microcomputer chess game.

A comprehensive instruction manual is supplied with the program, and extensive libraries of classic opening moves and game histories are also included on the floppy disk. Both the Apple and Commodore versions permit toggling between traditional flat two-dimensional or exciting three-dimensional perspective video displays at any time during game play. Additionally, the Commodore version features the choice of keyboard or joystick game play, while the Apple version permits routine game-move histories to an optional line printer.

Colossus Chess IV carries a suggested retail price of $34.95 for the Commodore version and $39.95 for the Apple version and is available from better software and specialty stores everywhere.

For more information contact Firebird, PO Box 49, Ramsey, NJ 07446.

Mention that you read about it in *Computer Shopper*. ●

Ask the Guru
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module called APLWORKS.-SYSTEM. This module is first loaded at the usual $2000 in main RAM and then is moved down to $1000 where much of it stays for the rest of the Appleworks work session. The part that stays can be called the low core utilities.

The low core utilities provide around half of the fundamental low level subroutines needed by Appleworks. There are 51 low core utilities. Included are the screen macro commands we looked at a few columns ago.

Figure 1 gives you the names of these utilities and shows you their entry points.

For more details, check into the pre-release on my Appleworks Disassembly Script.

Where Can I Get Help On Apple Clones?

Try Doug Truman at ASCII. Doug has a voice helpline, a bulletin board, some newsletters, and bunches of places to get most any answer on clone questions.

I guess I am personally down on Apple clones. Over on the Incredibly Boring Machine side of the fence, clones are clearly the price and performance leaders, and only an epsilon minus would buy IBM rather than a clone.

In fact, big blue's onager is in a sling because their sales have dropped dramatically, the bottom has fallen out of their stock price, and key scapegoats have had to be given lateral arabesques. All because of a blatant failure to either innovate or be a price leader.

```
JSR $1000 ($3E25) - Original booting link
JSR $1003 ($1186) - Get program disk back
JSR $1006 ($11A1) - Load or run program segment
JSR $1009 ($1341) - Append string

JSR $100C ($1366) - Erase screen window
JSR $100F ($136E) - Scan keybuffer for escape
JSR $1012 ($139D) - Init screen window
JSR $1015 ($14D1) - Character to screen

JSR $1018 ($179D) - Hex to decimal ASCII conversion
JSR $101B ($1815) - Diagnostic hang
JSR $101E ($17D1) - 16-bit divide u/v
JSR $1021 ($1818) - Blork speaker & clear keybuffer

JSR $1024 ($1823) - Relative cursor to absolute
JSR $1027 ($1837) - Screen help prompt
JSR $102A ($1842) - Flagged desktop full check
JSR $102D ($1850) - Desktop full check

JSR $1030 ($1850) - Bottom screen line prompt
JSR $1033 ($186C) - Load and run desktop manager
JSR $1036 ($187A) - Save screen line to $0900 buffer
JSR $1039 ($18B4) - Grab stack passed parameters

JSR $103C ($191D) - Get numeric selection
JSR $103F ($1A77) - Hilight part or all of screen line
JSR $1042 ($1AFC) - Close RAM bitmap
JSR $1045 ($1B00) - Open RAM bitmap

JSR $1048 ($1B0B) - Init applications screen
JSR $104B ($1B2B) - Set change flag
JSR $104E ($1B34) - 8-bit multiply x * y
JSR $1051 ($1B4E) - 16-bit multiply u * v

JSR $1054 ($1B84) - Move down in memory
JSR $1057 ($1BAC) - Move up in memory
JSR $105A ($1BDF) - Revert to previous screen
JSR $105D ($1BF1) - Press space to continue

JSR $1060 ($1C21) - Print string to printer
JSR $1063 ($1D0F) - Open new screen
JSR $1066 ($1D35) - Get keystroke
JSR $1069 ($1E80) - Restore saved cursor position

JSR $106C ($1E8A) - Save current cursor position
JSR $106F ($1EB4) - Force character to upper case
JSR $1072 ($1EBF) - Force text string to upper case
JSR $1075 ($1ED9) - Compare text strings

JSR $1078 ($1EF8) - Copy text strings
JSR $107B ($1F3E) - Justified string to screen
JSR $107E ($2029) - String to screen with number
JSR $1081 ($1FD1) - Stall Y/8 seconds

JSR $1084 ($1FE0) - Reset key buffer to empty
JSR $1087 ($2093) - Message to screen at cursor
JSR $108A ($1FE9) - Print one character
JSR $108D ($20AE) - Print character full screen

JSR $1090 ($20BE) - Print n identical characters
JSR $1093 ($1FF5) - Message to bottom screen line
JSR $1096 ($20D6) - Verification rompt
```

Fig. 1 - Appleworks Low Core Utility entry points.

On the Apple side, you have an odd mix of clones, ranging from serious and useful machines, through Hong Kong alley sweepings sold by refugees from a carnival midway, down to junior high school kids in a garage that claim compatibility without so much as checking out their bus noise or clock phasing.

Our helpline has been replete with horror stories. One person had their "100 percent compatible" clone for six months before discovering that it had no HIRES graphics.

Another has a thermal intermittent that seems almost impossible to service. Yet another has a clone with bus lines so noisy as to be useless. Countless others have really major software compatibility problems.

I guess the worst problem is that the wrong people buy clones for the wrong reasons.

The key test on building an Apple clone kit is this: If you normally use your personal Tektronix oscilloscope more than two hours a day, then you might be able to successfully complete an Apple clone kit. If you use your personal oscilloscope less than two hours a day on the average, then you shouldn't even think about it.

What's really sad about all this is that Apple could instantly eliminate the entire clone market with one simple and painfully obvious step. Just offer very substantial trade-in allowances for Apple II or II + owners when they upgrade to a IIe or IIgs. Do this, and the clones will all dry up and blow away.

Show Me Another ProDOS AppleWriter 2.1 Patch?

Sure thing. In continuing our one-a-month series of patches for ProDOS AppleWriter 2.1, in Figure 2, you'll find the much asked for Stretchifier patch.

What this patch does is not count embedded printer commands as part of a real line count. This eliminates the "shortlines" caused by extensive printer commands, especially in the fill justify mode.

Details on this patch for older AppleWriter 2.0 appeared in my *AppleWriter Cookbook*.

Incidentally, Apple has quietly reinstated the $50 upgrade policy for owners of DOS 3.3 AppleWriter who wish to upgrade to ProDOS AppleWriter 2.0 or 2.1. Contact them directly for more information. Apparently upgrade delivery is a tad on the slow side, but it is most definitely available.

This patch is for ProDOS Applewriter 2.1 version AWD.SYS only. AWD.SYS runs only on the 80 column IIc or the 128K IIe.

It eliminates the "shortlines" caused by counting embedded printer commands as real characters.

For every escape character found and actually used in the line, two extra counts are added to the line length. This exactly compensates an embedded escape command followed by a single character.

The 2.1 Scrunchifier patch MUST be previously installed.

```
1. Make a third or higher backup copy of ProDOS
   Applewriter 2.1, using the filer utilities.

2. Get into /BASICS.SYS.  Then CALL -151 to get
   into the monitor.

3. BLOAD AWD.SYS, A$2000, E$6020, T$0C, D2

4. Verify $49D1-    99  00  1C

   Change $49D1:    20  CA  59

5. Verify $49F8-    4C  DE  4B

   Change $49F8:    4C  D6  59

6. Verify $59CA-    11  11  11  11  11  ...

   Change $59CA:    99  00  1C  C9  1B  D0
          $59D0:    04  E6  75  E6  75  60  C4  7E
          $59D8:    F0  0E  B9  00  1C  C9  1B  D0
          $59E0:    04  C6  75  C6  75  88  D0  EE
          $59E8:    4C  DE  4B

7. Verify changes per 4,5, and 6 above.

8. BSAVE AWD.SYS, A$2000, E$6020, T$0C.
```

Fig. 2 - ProDOS Applewriter 2.1 Stretchifier patch.

How About Another Contest?

As usual, an Incredible Secret Money machine to the best ten responses, along with an all expense paid (FOB Thatcher, AZ) tinaja quest for two to the overall winner.

The new operating system for the Apple IIgs has the ability to select 128 disk drives, each of which can address 4 gigabytes of on-line data.

Combined together, you now have the ability to place half a terabyte of data on-line.

The contest is simple: Show the best concept for a HUNT THE WUMPUS game using half a terabyte of memory.

Only to be completely fair about this, UNIX programmers are specifically prohibited from entering.

How Can I Sign My Name?

Why, with AppleWriter on a IIe or IIgs, of course. Driving a LaserWriter. And, as is usual, helped along a tad by a utility or two of my own. How else could you possible sign your own name?

In fact, the International Brotherhood of Forgers and Embezzelers Local #106 has voted AppleWriter to be the greatest thing since blank checks.

Figure 3 shows you a sample signature, while Figure 4 shows you the simple Postscript code needed for the first name "John," and a sample printout. Oh, yes, you will also need a free copy of my new curvetracing routine, which you can get by calling or writing.

With practice, it takes around 20 minutes to enter a signature, using nothing but a surprisingly few stabs from a safety pin. No scanners or digitizers of any type are needed. As you can see, the results are absolutely exceptional.

If you wanted to, you could easily add pen skips and variable line weights, ink spatters, etc. to the signature grabbing process.

Are AppleWriter Graphics Really That Good?

They sure are. I've seen the publisher of the leading Mac magazine state in his industry newsletter that if you want good graphics, you should really use AppleWriter.

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Thanks again,

Don Lancaster

Don Lancaster
SYNERGETICS

Fig. 3 - An AppleWriter signature.

MacUniverse

by L. J. Kutten

Happy Birthday to Me: This column represents the third year of MacUniverse's existence. It seems like only yesterday I started commenting about a 128K computer with no commercial software, no external disk drive, a dot matrix printer that was outrageously slow. Now if the rumors are true, within 4 months Apple will release the third step in the evolution of the Macintosh.

A question for Apple: I received a letter from David Shugarts of Patterson, New York. He asked a fundamental question regarding Apple's parts policy. He wants to know why he cannot do his own minor repairs. He is prevented because of Apple's parts policy: it does not allow parts to be sold directly to customers; they have to be installed by the dealer. Its not that David is a hardware hacker or anything sinister, he just feels he can do some repairs himself. And the $50 and up per hour that he does not pay to the dealer for labor is money in his pocket to buy other things.

This intrigued me and I started checking about policies at other micro manufacturers. I discovered parts were sold for Radio Shack, IBM, and Atari micros. I called Apple for an explanation, but all I got was the run around. Now I could almost understand this policy if Apple had some stringent quality control in place for dealer repairs. But I know from personal experience this is not true. Now the capitalist in me says that a little free market competition would be beneficial for us and Apple. The independent would charge a lower price and force the dealers to improve their quality.

Now I am told the honchos at Apple read *Computer Shopper*. So with a little bit of luck, someone in authority will read this column and tell me the rationale behind their policy. Once I know, you will know.

New Version of Excel: By the time you read this, Microsoft should have released version 1.03 of its Excel program. The main difference in version 1.0 is that (1) it supports the MC6881 floating point math co-processor (anybody want to give odds that the new Macintosh will not have this chip?), (2) linking capabilities between spreadsheets has been improved, (3) HFS, Switcher, and large screen monitors are supported, and (4) copy protection has been dropped. This upgrade costs $25 and all registered owners will receive notices.

Run from SpellNow: Rarely have I found a program so bad as SpellNow by Mainstay. It is a third rate spelling checker that should be avoided at all cost. It is so bad that instead of you paying $59.95 to buy it, Mainstay should pay you $59.95 to try it. It's sold as a "real time" spelling checker; as you type each letter in a word, SpellNow compares the partial word with its dictionary. As soon as it determines your word cannot be in its dictionary, it indicates a potential error by beeping.

SpellNow also works as a batch checker. Highlight any selection of text and SpellNow will proof it; it shows the word in context and asks you whether to add it to the dictionary, continue checking, or quit checking. There is no option to just add the word for the session. The target word is not highlighted and you have to read the selection to find it. Adding it to the dictionary takes 15 seconds on a hard disk and 25 on a floppy. Unlike all of its competition, SpellNow does not indicate the number of words checked or the number of errors found.

The implementation of SpellNow is so bad that it is useless except for the most masochistic of users. The most serious problem is the tiny size of the dictionary, 21,000 words. A number of everyday words that I expected to find were not; e.g. cabal, masochist, camouflage, relational, appellate, judiciary, technological, and billboard. Similarly many of the common abbreviations were missing (e.g. CA for California) as well as most plural words (e.g. it contained attorney but not attorneys, second but not seconds).

But the biggest joke with it is its thesaurus. It has only 2800 words! Now the publisher must have realized this was insufficient because it included an expansion process. Simplistically, the user has to create a line with the "root" word followed by the "leaf word" (i.e. the words the thesaurus should point out when the "root" word is selected). The problem with this approach is that if you knew what words to use, why would you use the thesaurus? I always thought the purpose of the thesaurus was to make suggestions when you do not know an alternative.

The implementation of the user interface presents problems. In the "real time" mode the only way to add a new word to the dictionary is to go to the menu bar, pull it down, and click on the command, "Add 'typed' to Dict." There should be a simple key command or the command should already be visible. Window management is another problem. To effectively use SpellNow the separate SpellNow window must be visible; it takes up almost 25% of the window space. Finally, correcting errors in the "real time" mode can drive a person crazy with all the beeping. Assume you misspelled a word, e.g. "bachelors" instead of "bachelor." For every character you backspace SpellNow will beep until it finds a potential word in its dictionary. This means it will beep when you backspace over the "s," beep when you backspace over the "1," and beep when you backspace over the "o."

Finally for an interactive spelling checker, SpellNow works with very few programs. I pulled up every application on my hard disk that allowed text entry. It worked perfectly with Microsoft Word, MacWrite, and the Finder. With everything else I had problems; in Excel, the menu bar became messed up; in More its window opened up but was nonfunctional, and in File, it would not even open up.

KidsTime: KidsTime is still

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New SCSI External Hard Drives

Rodime Inc., Peripheral Systems Division recently announced two new hard disk drives for the Apple Macintosh Plus.

The Rodime 20 Plus and 45 Plus are 20 and 45 Megabyte external disk drives for the Apple Macintosh Plus. Both drives use the Mac Plus' high speed SCSI (Small Computer Systems Interface) connector port, making them up to ten times faster than the Mac Plus' floppy drive and up to six times faster than hard drives that use the floppy port.

Rodime Plus Series drives fit neatly under the Macintosh Plus. Both have easy to use FileGuard software to back up data onto floppies. Two SCSI interfaces allow daisy-chaining of up to seven SCSI peripherals. The drives are 100% compatible with peripherals. Two SCSI ports allow daisy-chaining of up to six additional external SCSI peripherals. The drives are 100% compatible with Apple SCSI implementation.

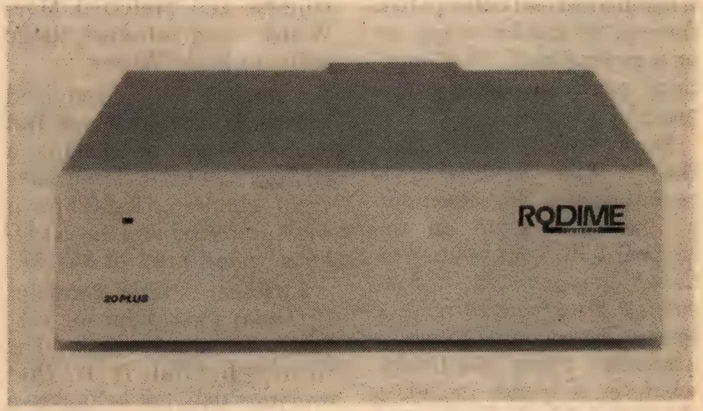
When installed, no cumbersome modifications need to be made to the Mac Plus or the drive. Qualified dealers will be able to install in less than 15 minutes.

The units each have independent power supplies and embedded drive controllers to handle all error correction and disk management by sector. Self-diagnostics identify and flag twenty-eight different fault conditions in the drive, controller or power supply. Both drives have a full one year limited warranty.

The new products are among the first of a full line to be introduced by Rodime Inc., Peripheral Systems Division. Rodime's parent company, Rodime PLC, is a major Scottish-based manufacturer of disk drives supplied to OEMs in the U.S. and Europe. The new products will be sold directly to computer resellers.

Suggested retail price is $1,295 for the 20I Plus and $1,695 for the 45I Plus.

For more information contact Rodime Inc., Peripheral Systems Division, 29525 Chagrin Boulevard, Suite 214, Pepper Pike, Ohio 44122; 216/765-8414. ●



Product Fact Sheet

Product: Rodime Plus Internal Series, 20MB and 45MB Internal SCSI, Disk Drives for the Macintosh Plus

Specifications:	20I Plus	45I Plus
Number of disks	2	4
Number of data heads	4	6
Formatted capacity (M bytes)	21.3	45.5
Number of cylinders	305	872
Tracks per inch (maximum)	600	1,040
FRPI (maximum)	14,700	15,072
BPI (maximum)	22,100	15,072
Rotational Speed (RPM)	2,750	3,600
Average latency (ms)	10.9	8.3
Seek time including settling (ms)		
Single cylinder	18	7
Average	85	28
Maximum (305 cylinders)	180	60
Interface	SCSI	SCSI
Cables and Documentation included.		
One year warranty.		
List Price:	$1,295	$1,695

LaserWriter Password Woes

by Dan Smith

Our LaserWriter is broken. It seems to be in full mechanical and electronic health, prints a normal test page on power up, and talks interactive PostScript through the serial port.

It's the password problem. For those who know what that is, we're wondering if anyone has definitely seen it occur as a spontaneous malfunction or whether we have to assume malicious mischief, and we want to know if there's any known workaround other than a full board swap (removing the EEROM? or editing Laser Prep with the resource editor?)

Two days ago, I didn't even know a Laserwriter has a password. Now I know a great deal more about it. Here's what I know:

- The Laserwriter has an internal EEROM (electrically eraseable ROM) which stores nonvolatile information such as the number of pages printed. Some of this information is system parameters like the baud rate at various switch settings, the time it will wait for a manually fed page, etc.

- Access to these values is protected by a password. It's an integer that is initially 0. Apple does not tell you anywhere I know of that there is such a password, or give you user-friendly tools to change it. It is easily changed by anyone who knows PostScript and the procedure is straightforward and documented in the PostScript reference manual.

- Strangeness: the standard Apple laser prep file begins with the commands "serverdict begin exitserver." This is a sequence that executes only if the password is set to 0. Otherwise a correct nonzero password has to be included in the sequence.

The purpose of the password is to protect nonvolatile EEROM settings from unauthorized tampering.

So, does anybody know...

- WHY does Apple's standard software print software need access to password-protected areas of PostScript in order to do normal printing?

- Is it technically feasible for a user, or Apple, or Aldus to produce a prep file that will print on a Laserwriter regardless of how its password is set?

- Does the standard printer initialization actually write to the EEROM (which is only rated for 10,000 writes)?

- If the password is set nonzero, all normal Apple laser printing fails. Everything looks perfectly OK up to the last instant. The Laserwriter prints a normal test page on turn-on. Chooser recognizes its presence on the Appletalk network and shows it as choosable. When you print, the "Looking for Laserwriter..." message comes up, then quickly goes away. A short time later a message appears with a phrasing something like "Password error, offending command exitserver." Various things then happen depending on what application is printing, but printing is not one of them.

- The password protection is serious and carefully thought out, with details like a one-second delay on any operation that checks the password (to slow down systematic search). If there are trapdoors or overrides or logical ways around it, their existence is a fairly well-kept secret. According to Adobe, if you don't know the password the only way to regain control is to replace the EEROM.

- This sets up an interesting catch-22 situation. Instead of protecting you from potential malicious mischief, the password makes you vulnerable to it. Now that we know about it, even after the Laserwriter is fixed we can't do anything to prevent it, since printing requires leaving the password set to 0 (i.e. leaving the system unprotected).

- Interesting question #1. Can this be the result of anything but malicious mischief, some kind of EEROM failure for example? We'd like to think so. For one thing, we're not in an environment where it seems likely (not a university, for example). However, the LaserWriter is supposed to do some kind of check on the EEROM on startup and revert to default values if they're inconsistent.

Questions:

- Has anybody seen what a users-eye view of an EEROM failure looks like? Has anybody seen an EEROM failure cause the password problem? Has anybody seen an EEROM failure result in something recognizable being indicated, perhaps on the startup page?

- Is it just coincidence that ours failed shortly after the publication of an article by Don Lancaster that widely disclosed the existence of the problem?

- Interesting question #2. Is there a solution other than a full board swap? Our field service rep (General Electric) has what looks like a full Apple Laserwriter service manual and it's interesting that it does not address this question at all. In fact, the board pictorial only calls out the ROM locations. There is nothing in the manual that even identifies the location of the EEROM. There are several socketed chips. Questions: does anyone know

- Is the EEROM socketed? Which one is it?

- Is it easily field swappable?

- Is it by any chance possible that simply removing the EEROM will cause the Laserwriter to deduce EEROM failure, assume default values, and (thus) resume normal operation?

Final chapter: our Laserwriter is under service contract, and they fixed the problem by doing a complete board swap...

Oh, of course, the final lot of totally unproductive "questions:"

- Is anyone at Apple aware of, concerned about, or doing anything about this potentially disastrous situation? Other than keeping quiet about it and hoping nobody will notice?

- What should irritated users do about it? Sue? Yell and scream? Send complaint letters to John Sculley on Macintosh disks which, when booted, execute a program that resets the password on their Laserwriter?

●

MacUniverse

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another of the multitude of computer programs designed to educate children through "play." Designed by Great Wave Software for the average three to eight year old, KidsTime has five games: KidsNotes, Story Writer, ABKEY, Match-It, and Dot-to-Dot. Most of the programs can give audio verification of what is typed on the keyboard.

KidsNotes is designed to increase a child's interest in music. A piano keyboard is displayed on the screen and the child uses the mouse or keyboard to "play" it. As each note is entered, the piano key is highlighted and either played through the speaker or appears on a musical staff. The "creations" can be saved to disk and played back later.

Story Writer develops typing skills. The keyboard is reproduced on the screen and as the child types on the keyboard, the key's position on the screen is highlighted. If the child is too young to read, a special "story book" font is available. Using MacIntalk, whatever is typed, including the pictorial font, can be read back to the child.

ABKey is merely a variation on learning the alphabet. Letters or pictures are presented on the screen and disappear when either the correct key or beginning letter is pressed. Options include upper or lowercase letters, voice, and timing. As the child becomes more proficient, it gets harder.

Match-It does what the name implies. The child is presented with a row of cards on the screen. He is supposed to drag the cards to their proper places. Cards include letters, words, pictures, and even a puzzle.

Dot-to-Dot is a rendition of the old game, connect the dots. As the child moves the pointer from dot to dot (either by number or letter), connecting lines appear. When the puzzle is completed, the complete picture appears to fill in the details. New puzzles can be created from preexisting MacPaint documents.

It is hard for me to judge educational games, so I gave it to my five year old daughter for her "expert" evaluation. She liked KidsNotes, Match-It, and Dot-to-Dot. She said they were fun and she especially liked it when I took her favorite picture and converted it to Dot-to-Dot. With ABKey she got bored within 15 minutes and preferred MacWrite, using extremely large fonts, to Story Writer.

Overall I will recommend KidsTime. I liked it and feel you will not be making a mistake to buy it if you have small children. KidsTime is copy protected and has a suggested retail price of $49.95.

UpTime: A order form for *UpTime*, a magazine on disk, came across my desk. The theory behind it is that everyone does not belong to a user group or have access to a commercial service such as CompuServe, the Source, or GEnie. So for the price of the subscription, the publisher will send you a monthly disk loaded with best public domain and shareware programs, fonts, news, and the like.

UpTime has the possibility of being a very useful product and I recommend it to anyone who fits within the target audience. But there is one caveat with it: the quality of the programs can vary greatly. If you subscribe, start out with a short subscription. *UpTime* has a variety of subscription terms available, ranging from $14.95 for a single issue to $89.50 for a full year.

MicroPhone: MicroPhone is a full-featured Macintosh telecommunication program published by Software Ventures. It was developed by Dennis Brothers, the original Macintosh telecommunication guru. It does its job and does it well.

At the user level, MicroPhone has two features that separate it from its competition: the Microeditor desk accessory and its script command implementation. The Microeditor lets you create perfectly formatted letters and messages while on-line. At first brush it appears very similar to MockWrite, a desk accessory I have mentioned in earlier columns. However, it has one unique feature; an automatic carriage return every 72 characters. This means when you upload a file created by it to CompuServe or elsewhere you will never get an error message that you have too many characters on a line.

The script command procedure is brilliant. This is used to automate frequently done tasks; instead of typing a long sequence, a push of a button or a click on a menu sends the needed commands. With MicroPhone's main competition, Red Ryder, the user is responsible for getting the syntax and grammar correct. Not so with MicroPhone. Instead the user pulls down script menu and clicks on the needed command and then adds the additional text (such as what text to send or the name of a file to open). Once done the correct command appears in the script box. And if the logic of the command is incorrect (such as telling the computer to capture incoming data without opening a capture file Micro-

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PC2COM: An IBM to Commodore Interface Standard

by Ted Drude

Part 2: An Inexpensive Parallel I/O Port for Your PC-Compatible!

Last month, we presented the first part of a series of articles on PC2COM, an inexpensive, yet fast, IBM PC-compatible to Commodore computer interface standard. That article defined the general parameters and considerations surrounding the interface. This month, we're going to look more closely at the PC-compatible hardware side of the interface.

This information should interest not only those using the PC2COM interface, but anybody who needs an inexpensive PC-compatible parallel I/O port. In upcoming articles, we will continue with more information on PC2COM, including a discussion of the software primitives that drive the interface, with examples.

In Search of An Inexpensive Parallel I/O Port

An important part of PC2COM, is the bi-directional parallel port used on the PC-compatible side of the system. In order to keep costs as low as possible, it was decided to forego the development of a custom parallel card for the PC-bus. Instead, a better solution was found: modify a standard Parallel Printer Adapter card to work as a bi-directional 8-bit I/O port, with handshaking lines. With just minor reworking, this card can function as a high-speed interrupt driven I/O port, and still retain full software functionality as normal parallel printer adapter.

Specific, but brief, instructions were given in the last article, on modifying the standard IBM Parallel Adapter for this purpose. This second installment in the PC2COM series is a more detailed description of the theory behind that modification. We're doing this for two reasons. First, in order to better understand the mechanics of the PC2COM interface. Second, because last month's instructions were directly applicable only for the stand-alone IBM card.

Many PC-compatible owners don't have that card. Instead, they may be using a clone of the IBM Monochrome Adapter (which also has a built-in printer port), or one of several other multi-function cards with a parallel port. By presenting the theory behind the modification, it should be easier to modify your particular parallel adapter circuit to work with PC2COM.

Before We Start...

We'll review the normal operation of the parallel adapter circuit before we get to the specific modification instructions. I recommend you get a copy of the complete schematics for your particular adapter for reference. The complete schematics for both the stand-alone IBM Parallel Printer Adapter and the Monochrome Adapter's parallel printer section can be found in several places, most notably in the appendices of the IBM PC or XT Technical Reference Manual, and the IBM Options and Adapters Tech Reference Manual.

If you are using an Asian clone type multi-function card, you may or may not be able to find a schematic for it. If not, try to get a peek at the IBM schematics. You might even consider a $50 investment in one of the IBM Tech Reference manuals. They're loaded with good PC-hacker information.

The modification instructions, as presented here, really don't require a complete schematic, you could probably figure out where to make the circuit mods just by studying the PC board traces. But having a schematic handy is helpful in understanding the theory behind what's going on. (Figure #1 is simplified block diagram of the parallel adapter circuit and you can also refer to it during this discussion.)

Since the parallel adapter is meant to work with the Centronics standard parallel interface, it's also helpful to have some reference information on those lines. Some printers using the Centronics interface have a section describing it in their manuals. I found a section in my Epson RX-80 printer manual most helpful in this respect.

Parallel Adapter Circuit Description

The standard parallel printer adapter card was designed as a one-way output port (with some extra handshaking) to drive a Centronics compatible printer. Compared to the complex features found in other parallel chips, like the 8255 PIA or 6526 CIA, it's a rather sparce circuit. This same basic circuit is found on both the stand-alone Parallel Adapter, and the Parallel section of the Monochrome Display adapter. Most other PC-clones, and third party multi-function cards use circuits that are equivalent to the IBM cards.

Bus Interface and Address Decoding

The first part of the parallel adapter circuit is the bus interface and address decoding section. It consists of an LS245 tri-state data transceiver, an LS155 address line decoder, and some other simple LSTTL glue chips. All these chips are then connected to the PC-bus edge connector. The bus interface is a simple bi-directional, tri-state buffer, driven by the PC-bus signals, and needs no further elaboration.

The address decoder chip inputs port addresses from the PC bus, and then decodes them into five output lines. Those lines are configured to form three distinct I/O ports in sucession, based on a configurable starting address. The lines that form the three decoded port addresses are then directed to the other TTL chips that form the actual I/O ports.

The three adapter ports are defined as (A) the Data Port, (B) the Printer Status Port, and (C) the Printer Control Port. Of the five lines output by the address decoder to the ports, we are interested in only one of them, which is labeled **WPA**, for Write Port A, (the Data Port). We will be taping into this line later.

The software definition of the adapter ports is provided in Table #1. The three registers are shown as they normally appear when address decoding starts at 0378h. As you can see, the three low bits of the Status port, and the three high bits of the Control port are normally

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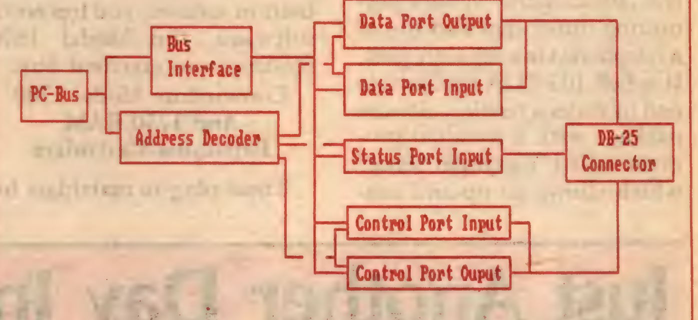
Port				Bits				
Address	7	6	5	4	3	2	1	0
0378	Data 7	Data 6	Data 5	Data 4	Data 3	Data 2	Data 1	Data 0
0379	Busy	Ack	P.End	Select	Error	---	---	---
037A	---	---	---	IRQ7	Slctin	Init	AutoFx	Strobe

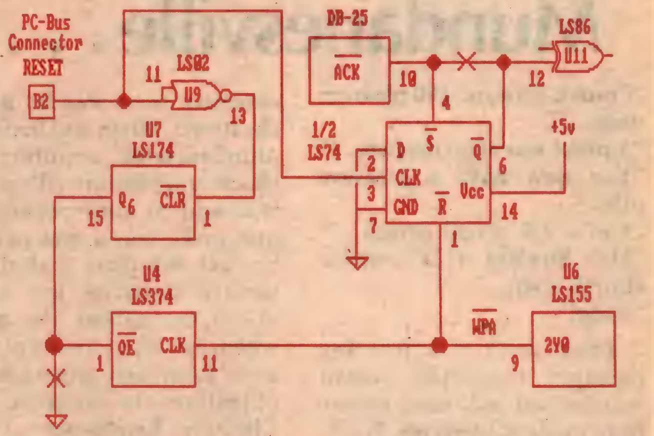
(Table 1 - Parallel Printer Adapter Ports)

DB-25 Pin #	Description
1	Strobe
2	Data 0
3	Data 1
4	Data 2
5	Data 3
6	Data 4
7	Data 5
8	Data 6
9	Data 7
10	Acknowledge
11	Busy
12	Paper End
13	Select
14	Auto Feed
15	Error
16	Init Printer
17	Select Input
18-25	Ground

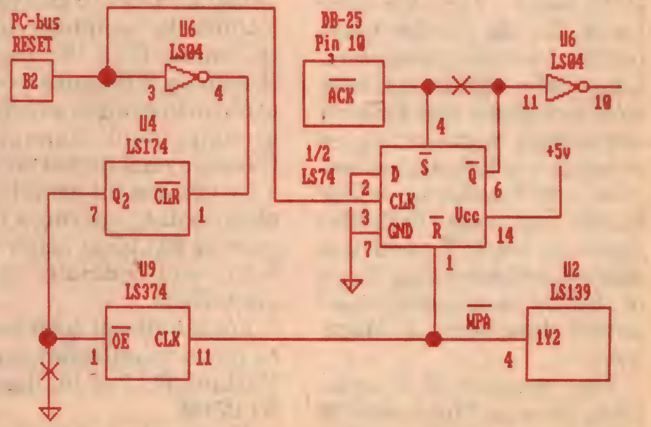
(Table 2 - Parallel Printer Adapter DB-25 Pin Connections)



(Figure 1 - Parallel Printer Adapter Block Diagram)



(Figure 2 - IBM PC Parallel Printer Adapter Modified Schematic)



(Figure 3 - CPC Parallel Adapter Modified Schematic)

Some Commodore Buys For 1986

by Mike and Al Koller

Although there remain some questions about the condition of Commodore as a company and the future of the Amiga computer, those of us with Commodore 64s or 128s have had a field day in 1986. With the large and still growing installed base of these machines, third party vendors continue to develop both hardware and software products to tickle the fancy of users, and we are the real winners!!! Here are some samples of the best products available for buyers this year.

Commodore Model 1670, 1200 Baud Modem

This modem is one of the best hardware values in personal computing today. It is Hayes compatible, inexpensive (less than $100 by mail order!), simple to use and comes with software and free time on Commodore's "QuantamLink" system. Like the 300 baud Model 1650, the 1670 plugs directly into the user port and is a "stand-alone" system permitting direct dial and use of a telephone via a separate jack. It is Bell 103/212A compatible and includes a terrific software package with a terminal program called "Common Sense" which allows set up and control of just about every aspect of your C-64/128 telecommunications protocol. "Common Sense" supports just about every known modem for the Commodore 64 and 128, and it is worth the price of the package by itself! With it you can store telephone numbers for auto dial, use a disk wedge, upload and download using the Xmodem error-free transfer, program your function keys, do a screen print, change screen colors, and control your disk drive all from within the program. There is also an on-screen clock and a built-in screen editor.

In addition to "Common Sense," the software with the 1670 provides emulation programs for the DEC VAX VT-52 and VT-100 terminals. The DEC VT-52 works with both the C-64 and C-128, while the VT-100 works only with the C-128. Both programs allow terminal emulation for mainframe connection. With auto dial, auto answer, auto baud rate detect and shift, built-in speaker, and top notch software, the Model 1670 modem is an excellent buy.

Commodore Model 1700 And 1750 RAM Expansion Cartridges

These plug-in cartridges for the Commodore C-64 and C-128 computers provide convenient add-on RAM expansion at very low costs (as low as $79 for 128K with the Model 1700 and $129 for a whopping 512K using the Model 1750). Although third party software developers are not yet selling packages making extensive use of these devices, they soon will be. Meanwhile, those people wanting instant power in CP/M mode can have it right away, and using the RAM as a "second" drive is really fun. The cartridges are small (4"x5") and plug directly into the cartridge port. The computer automatically "looks" for cartridges at power up, but these do not affect the normal sequence of events. The Model 1750, which we have used extensively, maintains full memory even after power-down for as long as 15 minutes or more, so surges due to lightning, for example, will not destroy your work, even though there is no back-up power. Imagine having a C-128 with 640K total RAM at your fingertips. You get a self-test system, a software disk with C-128 computer demonstration programs. You also get a CP/M operating system designed to take advantage of the added memory through bank switching operations which extend the computer's operation beyond the 64K typical of most CP/M systems. Furthermore, with the Model 1571 disk drive you can store more than a double density disk of data directly in RAM, access it at 1Mb per second, and move data from one disk format to another without any problems. Because the RAM is only accessible indirectly except when using CP/M, it is somewhat awkward to use unless you have a working knowledge of BASIC. However, only three commands—STASH, FETCH, and SWAP—are required. Machine language applications will provide tremendous power for home users when software is designed to take advantage of this cartridge. Look for it in early 1987.

MIDI Magic by QRS Digital Music

QRS Digital Music has come out with the perfect inexpensive MIDI interface for the home computer user and home musician. It comes with a disk of six very well written songs to try on your home computer and home music synthesizer (which must have a MIDI port). "MIDI" stands for Musical Instrument Digital Interface and is a standard language that music and computer people around the world have developed for the music industry. QRS has put together a small music package which introduces the capabilities that MIDI makes available through technology. In the package you get a MIDI interface which plugs into the user port of the C-64 or C-128 and then is plugged into the MIDI port of the music synthesizer. The package also provides software accessed through the main menu of the program. The program is very simple to use provided the user knows how to access the MIDI port on his synthesizer. This port is usually automatically initialized when the synthesizer is turned on. QRS suggests that the synthesizer have a voice range of 8 to 12 voices, but "MIDI Magic" will work on a 6 voice synthesizer with a little smaller sound. For the home user who just wants a modern rolling player piano played through his home synthesizer by his computer, or for a professional who just wants an inexpensive MIDI interface for his synthesizer to run on his Commodore computer, this program is excellent. At $39.95, this package is the best software and hardware combo we found for this purpose.

Abacus Software's "BASIC 128"

"BASIC 128" is a basic compiler and development system to speed the execution time of your BASIC programs using BASIC 7.0 on the C-128. The P-code generated is at least 10 times faster than uncompiled BASIC programs and takes significantly less memory. It will also compile machine code to give "order of magnitude" increases in speed. There is some degree of automatic error messaging and fault detection built in. As with most Abacus products, BASIC 128 comes with excellent, quality documentation in a loose-leaf binder. It is menu driven, allowing direct execution of the options (there are four available) without wasting excess time on paperwork. As the compiler operates, line numbers and status information are displayed on the screen. The compiler is not really "quick," but it is respectable, logging error messages and continuing to compile unless an unacceptable error (such as "disk full," for example) is encountered. Like all compilers, BASIC 128 is only as effective as the program you choose to compile. Some programs will not run after compilation, but the BASIC 128 system has several options designed to let you get the most out of your compiled program. Special options allow choices of parameters and optimization levels to tailor your program to the degree of complexity and speed required. This is a very capable and powerful BASIC compiler, but it should be noted that **this software is not for the beginner**. It will take time and skill to get the most out of this package. Price is $59.95.

X-10 Powerhouse by X-10 (USA) Inc.

The X-10 Powerhouse Computer Interface, Model CP290 is an RS-232 compatible system which permits the programming of electric power "modules" for computer control of appliances, lamps and switches in your home or office. The system uses a stand-alone interface module which connects to the C-64 (or the C-128 in C-64 mode) via the user port for programming, after which it can be disconnected for continuous control without need for the computer. The user programs the interface module by using the software which is provided with the interface. The software is menu and icon driven and allows even a novice user to have his computer take over the control of timing appliances and lamps on and off. The software allows the user to setup the interface module so that the user can have the lights come on and go off at anytime of the day, week, month, and year. The software also allows the user to save schedules so that he may change the patterns at which lights are turned on and off. The icons are mouse or joystick driven and allow the user to just "point and shoot" at any outlet in a specified room and that outlet will be setup to receive and control a module which the appliance is then plugged into for activation. Modules are available from several sources (including Sears and Radio Shack) for appliances such as radios or stereos; wall outlets for lamps and other systems which can benefit from voltage control for dimming, etc.; and switch modules which can replace wall switches for outdoor lights and security systems. The controller which forms the heart of the X-10 system has eight rocker switches which can be used to test the set up of each module. Modules have two thumb switches which permit codes to be set

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Just Another Day In Mundanesville . . .

"Frankie give you 100 pleasure units…'"
"A pistol was of no use here…"
"You now have a pleasure pill…"
"You're 4% a real person…"
"Mr. Straight is a regular church goer…"
"Bang!"

These are but a few key passages from the recent recreational software release from Firebird Licensees, Incorporated, Frankie Goes To Hollywood—The Pleasure Game, for the popular Commodore 64/128 computers. Latest sales figures certainly seem to indicate that Firebird has another mega-hit title on its hands, which is no great surprise, since Frankie topped the British software bestseller charts in the U.K. and was selected Best Adventure Game of 1985 by *Commodore Computing International Magazine*.

The scenario of Frankie takes place in Mundanesville where very mediocre people lead plain-vanilla lives. The objective is to wander about the streets, alleys and homes of Mundanesville acquiring artifacts and pleasure pills which will add to your personality and make you a real person. Several sub-plots and diversionary scenarios are introduced throughout the game which can lead unwary players away from their prime gaming objective—to achieve the Ultimate Experience at the heart of the Pleasure Dome.

Frankie Goes To Hollywood features the hauntingly addictive music from the popular rock group of the same name in addition to sporting astounding graphics and animation. Gameplay is initiated through a joystick and the game is supplied on disk, carrying a retail price of $34.95 at better software and specialty stores everywhere.

For additional information on product availability contact Firebird, PO Box 49, Ramsey, NJ 07446.

Mention that you read about it in *Computer Shopper*. ●

The Amiga Workbench

by Ervin Bobo

It's been another great month for Amiga software, as exemplified by the following arrivals in my mailbox: a talking spreadsheet; four of the great golf courses; a chess set that talks back; and an extra pawn.

Since this will be appearing near the holiday season, perhaps the following reviews will serve as a gift guide: circle the ones you most want and then leave *Computer Shopper* lying where someone who likes you will see it. What can you lose?

Well, perhaps your sanity as you try to crack the code of The Pawn.

As a rule, I find software imported from Britain to be complex, heavy-handed and pretentious. I'm not sure what this might tell us about British gaming—if in fact it tells us anything at all—but such was the case until I began playing The Pawn, the first adventure game I've seen that utilizes the talents of the Amiga.

You may play The Pawn as a straight text adventure or as a text-and-graphics adventure. The default screen is text, but by sliding your cursor to the top of the screen and clicking the right mouse button, you may pull down a picture of the current scene.

And they are beautiful pictures, landscapes dithered and airbrushed to a softness that fits perfectly with the mood of the game; other pictures with such sharp detail that it's sometimes difficult to remember you're looking at a computer monitor.

Atop the text screen are four scrolls. No, they are not pulldown menus in disguise, they are scrolls. You click them on and they drop down and stay open until you click again. On the scrolls are options, such as saving or loading a game; implementing speech, wherein the male Amiga voice reads you all the text; size of print; and clues.

If you've been adventuring so long that it's becoming difficult to read the screen text, clicking on Text gives you a forty-column display in large type. Clues are an exercise in cryptography: if you get stuck, go to the back of the book, find the questions you need answered and type in the encrypted clue.

Do this only as a last resort or you may miss much of the richness of The Pawn. Besides, the answer may be almost as cryptic as the code.

As the game begins, you've been out buying groceries, were slugged by a man you passed on the street, and now you wake up in a strange place and find a silver bracelet on your wrist. The purpose of the quest? Who knows? There are several, as a matter of fact, and how you play the game and make your moves and choices will determine your current adventure.

Playing the game is easy, as the parser is excellent in its understanding of commands in plain English such as "pick up the wooden key" or "hit the guard and run east" (don't try that one).

As an adventure game should be, The Pawn is full of surprises. We'd suggest you keep the parser in "verbose" mode in order to savor all the details of the game.

Another British habit seems to be in presenting documentation in the form of a novelette that serves as a "prequel." The exception this time is that the prequel for The Pawn is worth reading, setting the tone for a tongue-in-cheek adventure which you will soon discover is a high-level satire of adventure games, most especially those of the Zork trilogy.

The Pawn is available from Firebird Licensees, Inc., Box #49, Ramsey, NJ 07446 and at a suggested list price of $44.95.

The other pawns in the mailbox this month were from Chessmaster 2000, probably the most stunningly graphic chess game ever produced for a computer. And along with the graphics is an implementation of chess so good that it has already been awarded First Place in the 1986 U.S. Open Personal Computer Chess Championship.

I first saw Chessmaster in a version for the C64 computer and was very impressed with the 3-D display option. Here, it is even better, for the higher resolution graphics of the Amiga lead to a much more detailed screen. The viewpoint is from slightly above the board, much as you would see it if you were playing with a real board and real pieces—and this leads to a feeling of realism I've not seen in any other board game for a computer.

Further, your cursor has become a hand and you pick up a piece by clicking and holding as you move it across the board, then release the mouse button to set it down. For me, this action is much more natural than typing in coordinates and leads to a greter enjoyment of the game. (However, the coordinates option is open for those who prefer to use it.)

I also prefer playing with the Voice option on, though more serious chess fans may prefer silence or the bell tone. With the voice, your opponent informs you of illegal moves, says, "Oops! I goofed!" when he loses a piece and also comments on other occasions such as Check, mate, piece promotion, etc.

Pulldown menus give you your options in game play and they are many. There are twelve levels of play, with four styles of play available to each level; the board may be viewed in 3-D or in the conventional 2-D "bird's-eye" view; the board can be rotated 90 degrees in either direction; chess clocks may be turned on or off; and you can even make a selection between simulating a wooden or metal chess set.

At any point in the game, you may call up a list of moves made so far and these appear in a window in standard algebraic notation. This list may be printed and, in still another option, moves may be printed as they are made.

For those new to the game, a Teaching Mode will show legal moves for each piece as it is selected and if you like, the Chessmaster will suggest a move based on the current situation (I found it to be fair); games may be analyzed and in this review the Chessmaster will first display the best move, then the actual move you made and go on from there.

You may play Chessmaster against the computer, against a human opponent, or have the computer play itself. In addition, you may set up the board as a chess problem—either a classic or one of your own invention—and ask the computer to solve it for mate.

And speaking of classics, there are 100 classic games stored in a file drawer on the disk, ranging from a game played by Greco in 1620, through games played by chess superstar Bobby Fischer and ending with a match played between Chessmaster 2000 and Sargon III in 1986. Any of these games may be selected and watching the computer play them out may help you to develop our own game.

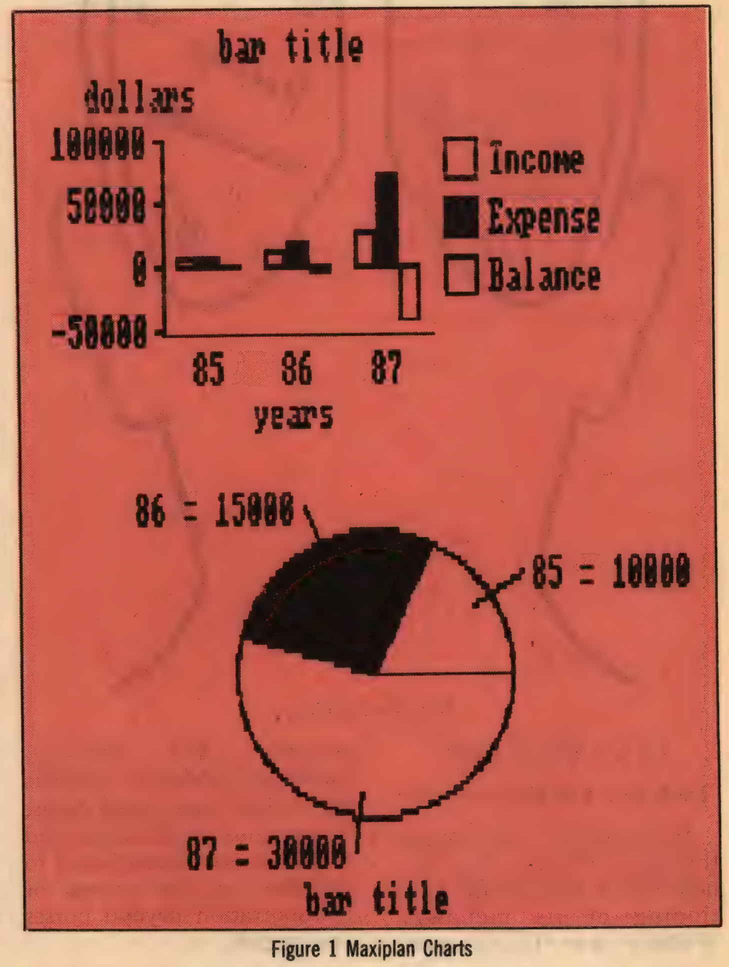

Figure 1 Maxiplan Charts

Chessmaster 2000 is available from Electronic Arts at 1820 Gateway Drive in San Mateo, CA 94404 and at a suggested list price of $44.95. 512K is required.

Although I enjoyed the speech abilities of Chessmaster, I was not thrilled by the speech of MaxiPlan, a spreadsheet that, among other things, will speak numbers as they are entered or that will read your notes back to you. There is a reason for the speech, of course in that it can provide an audible check of your entries, but I find the default Amiga male voice to be tedious in most instances. That, however, should not stop you from considering MaxiPlan or from adding it to your wish list, for it is a very good spreadsheet.

Beginning with the display, you choose either Standard or Enhanced from the pulldown menu. Standard utilizes the four Amiga Workbench colors while Enhanced, at the cost of some RAM, gives you eight colors as well as a palette for adjusting the colors to your preference.

In a conventional spreadsheet, additional color would be a "so-what?" feature, but in MaxiPlan, with its ability to convert your numbers into charts, we're looking at the difference between a good display and one that fairly leaps out and grabs your attention. (Charts may be printed in color. If you do not have a color printer, shadings will replace the colors to make a legible printout. See Figure 1.

To build a chart, open the Chart requester window and select from Bar, Pie or Line/Area. Then fill in the range of numbers to be worked on, as well as your labels. A few mouseclicks later, your chart will be displayed in a window at the lower left of the worksheet. Because it is a Workbench window, it can be both moved and resized and the size of the window seems to determine the size at which your chart will be printed. In addition, should you then change any numbers affecting that range, the chart will quickly redraw itself.

Another graphic feature is called Zoom. Click on the zoom box and a window opens to show your worksheet represented as a grid of tiny squares, some open and some filled with

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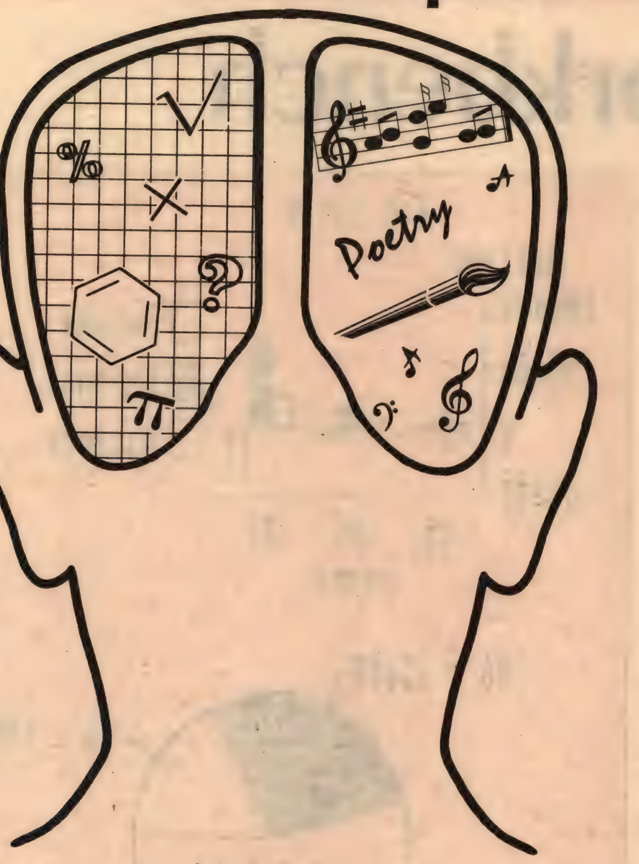
The Amiga: A Computer For The Right Hemisphere



Amiga On The Brain!

by J. Anthony Krett

Tools For The Human Race

Humankind has sought throughout history to evolve new ways to improve the functioning of its members. Writing was found more reliable than memory; machines produced products faster than hand-made items; and wagons, trains, autos, and airplanes each contributed to speeding up the process of transportation beyond horses and camels.

Communications have also benefited from similar inventions. Printing, telegraph, telephone, radio, and television, have all contributed their share in bringing today a greater access to vast stores of information. Some have called this a new era, the information age. In fact, the information about items is now becoming so important that in many cases it is more valuable than the products themselves. For example, how useful is a computer program without good documentation and clear instructions!

Another difference about this age is its turning towards the growth and expression of the inner spirit of mankind, called the psyche or soul by many. Today mankind turns to the computer as a tool aptly suited for the development and enhancement of the interior human qualities. This development centers about using the computer as an expander of the human spirit in all its capacities.

The Left Hemisphere

Most people are aware of the implied differences between the left and the right sides of the human brain. It is commonly held that the left side of the brain primarily controls logical reasoning, word skills, and number calculations. The right side of the brain, however, directs the abilities of intuitive perception, spatial relationships and a sense of time focus. Current personal computers can be compared by analogy to the functioning of these two hemispheres of the human brain.

Regular computers today focus on enhancing the abilities of the left logical side of the brain; i.e., the ability to process words and numbers. These left-brained computers simulate the left side operations of the brain such as the word skills utilized in word processing, spellers, outliners, and data based programs. Additional left side operations include the numeric processing skills used in spreadsheet, accounting, and statistical programs. Most personal computers being used in the world today function through their hardware and software in a primarily left-brained manner.

But into these left-focused computers are often installed special graphic boards to allow the computer to function more as a right-brained processor. Thus spatial relationships are shown by displaying pictures, grahics, and charts. Adding voice or music components allows the computer to express sound textures like the right side of the brain. These boards concur with special programs to mimic the right brain functions of human beings, and often utilize right side images as charts and graphs to explain more clearly the abstract verbal left side operations.

The Right Hemisphere

So much for left-brained computers, but what about right-brained ones? Why would one wish to compare a particular computer type to the functioning of the right side of the human brain? And what is the unique focus of the right brain? The following will consider several analogies to indicate the relationship between right brain functions and some of the features commonly found in the newer types of personal computers, especially as typified in the Amiga.

> ***Most personal computers being used in the world today function through their hardware and software in a primarily left-brained manner.***
>
> ***But into these left-focused computers are often installed special graphic boards to allow the computer to function more as a right-brained processor.***

The right side of the human brain focuses on space and time relationships. Thus right-brained personal computers would be geared to the processing of spatial relationships and time orientation. And since the Amiga has uniquely built into its hardware special chips dedicated to the functions of sight and sound, the Amiga could be considered as a premier right-brained personal computer.

To operate in such a way the Amiga uses its three special custom chips: (1) Agnes, the address generator, which controls the visible graphic display, (2) Daphne (Denise), the video output, which directs animation and movement, and (3) Portia (Paula), the input/output controller, which contains sound channels, interfaces, and special controllers. These special custom chips give the Amiga the ability to model time and space relationships directly and thus imitate right-brained functioning which is quite different from the usual personal computer's left-

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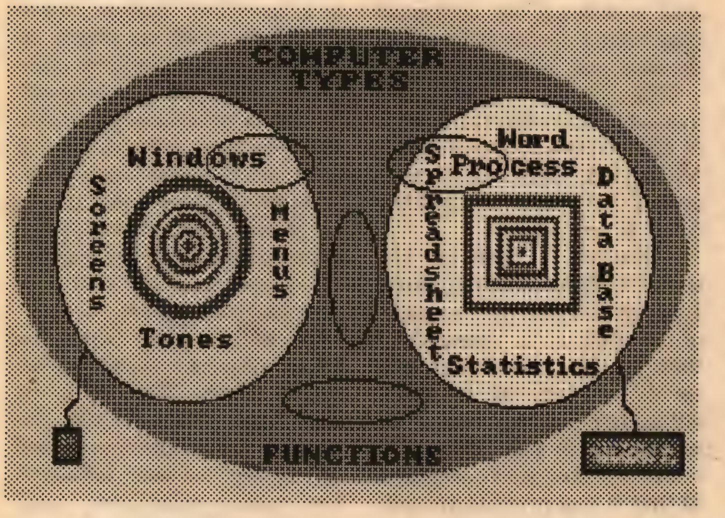
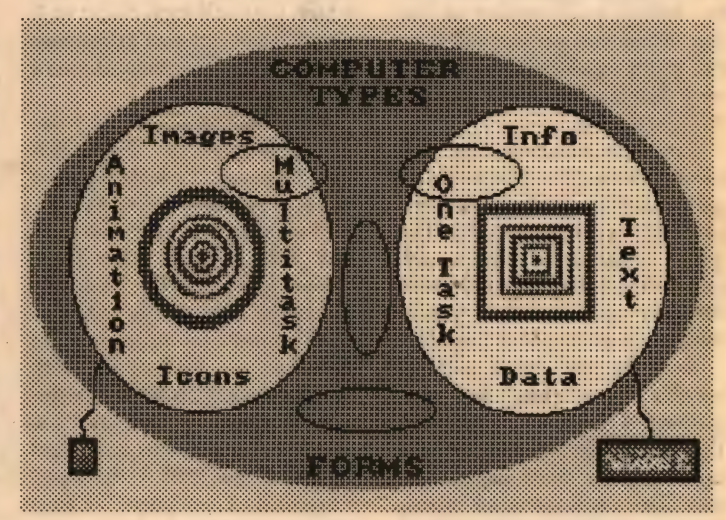
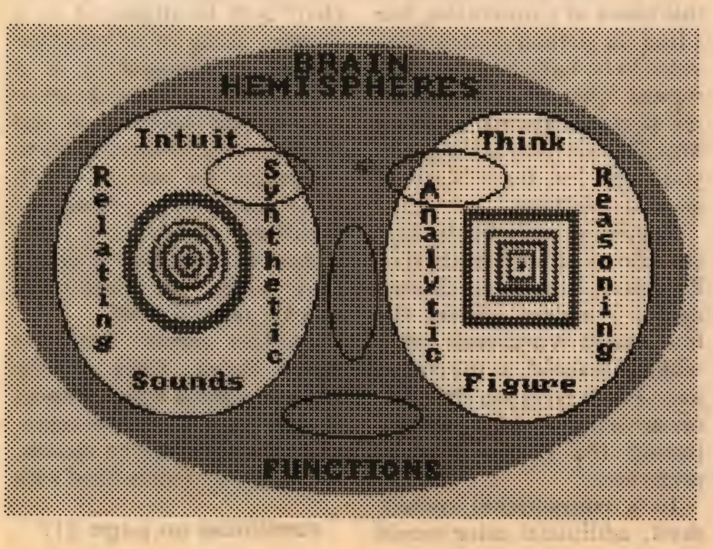
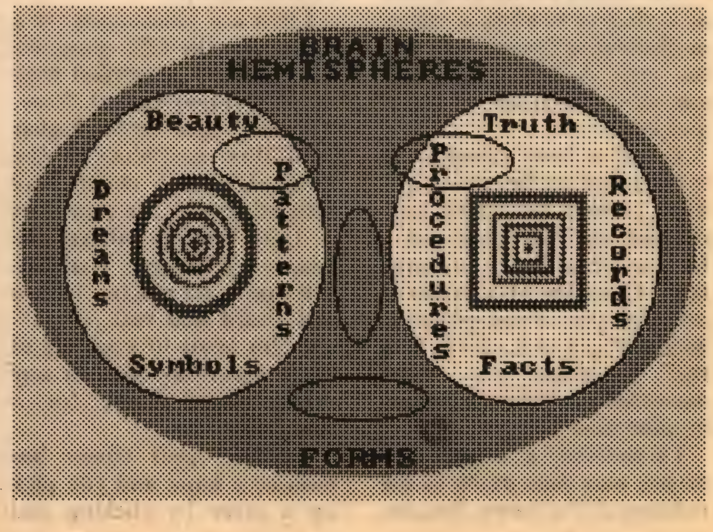
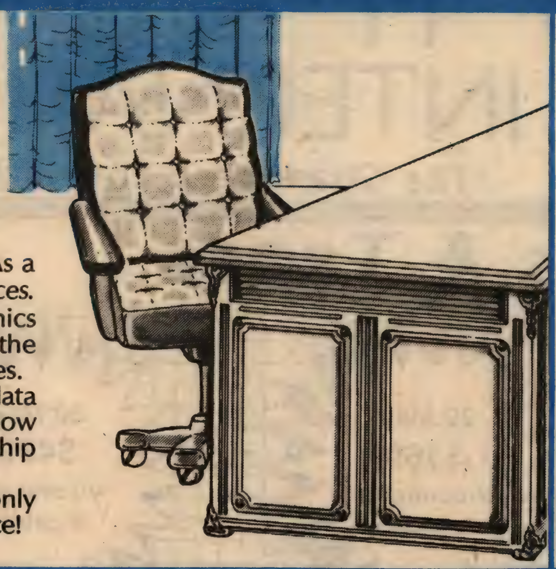








You Belong in this Picture—



You belong in this picture because you are a winner. As a successful person, you insist on reliable products at the *best prices.*

With more than twenty years experience in the electronics and computer fields, we are better qualified to give you the right answers, to make recommendations, and to offer choices.

MicroComputer Concepts is a major supplier of data processing hardware and software. Therefore the items below represent only a *partial* list of on hand products we can ship you immediately.

Because we know that winners like you will settle for only the best, we promise to work hard and to keep your confidence!

PRINTERS

BROTHER M1509 180 CPS 15"	369.
CITIZEN 120D 120 CPS, 80 COL	185.
MSP-10 160 CPS, 80 COL	285.
NEC P5 290 CPS, 132 COL N.L.Q.	989.
P6 200 CPS, 80 COL N.L.Q.	469.
P7 200 CPS, 132 COL N.L.Q.	649.
OKIDATA 182P/IBM 120 CPS	249.
192+ 200 CPS, 80 COL	369.
193+ 200 CPS 132 COL	549.
292E 240 CPS, 80 COL, COLOR	559.
293E 240 CPS, 132 COL, COLOR	699.
OKIMATE 20 w/INTERFACE	199.
PANASONIC	
1080i 120 CPS, 80 COL	219.
1091i 160 CPS, 80 COL	279.
1592 180 CPS, 132 COL	439.
3131 L.Q., 17 CPS, 80 COL	269.
STAR NX-10 120 CPS & N.L.Q.	239.
TOSHIBA	
321 216 CPS 80 COL P & S	459.
341 216 CPS 132 COL	669.

SOFTWARE

APPLEWORKS	195.
ASCII EXPRESS PRO	79.
CAD DRAFTING PKG	CALL
BANK STREET WRITER (APPLE)	43.
CLIPPER	349.
COPY II+, PC, MAC	25.
CROSSTALK	105.
DBASE III+ (IBM)	399
DOLLARS & SENSE (IBM)	105.
FAST BACK	99.
FLIGHT SIMULATOR II or JET	35.
LOCKSMITH (APPLE)	56.
LOTUS 1-2-3	319.
MANAGING YOUR MONEY	115.
MEGAWORKS	79.
MICROSOFT WORD (IBM)	259.
MULTIMATE ADVANTAGE (IBM)	329.
MULTIPLAN (APPLE)	59.
NORTON COMMANDER	42.
NORTON UTILITIES 3.1	54.
PFS: FILE OR GRAPH OR REPORT OR WRITE (APPLE)	70.
(IBM)	79.
PRINTSHOP (APPLE)	32.
PRINTSHOP COMPANION (AP)	26.
LIBRARY DISK 1, 2 OR 3 (AP)	19.
PRINTSHOP (IBM)	39.
RBASE SYSTEM V	349.
REFLEX	89.
SIDEWAYS (APPLE, IBM)	39.
TURBO LIGHTNING	59.
TURBO PASCAL	49.
WORD PERFECT 4.2	209.
WORDSTAR 2000+	299.
WORDSTAR PRO (AP/IBM)	259.

MODEMS

AMAZING THINGS 1200B w/BIT COM SOFTWARE	119.
EVEREX EVERCOM 2 1200 BD INTERNAL w/SOFTWARE	119.
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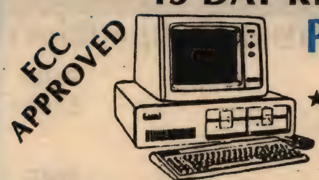

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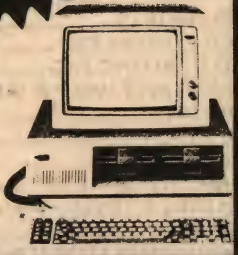

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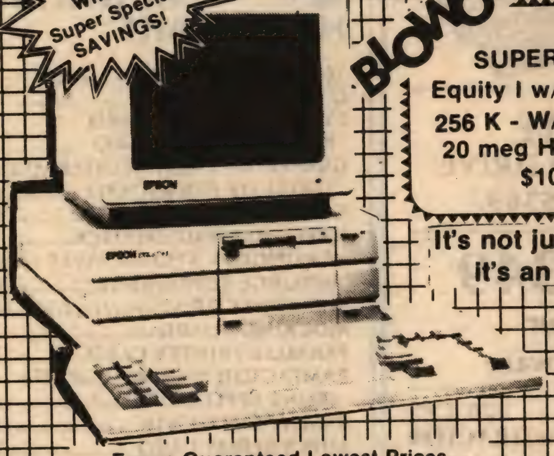

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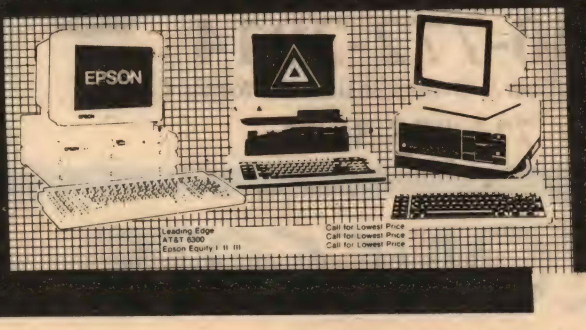

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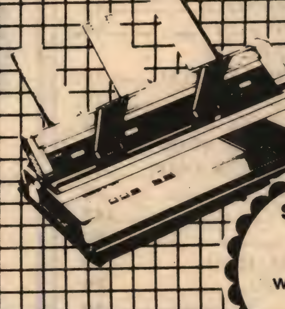

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Applying The Atari

by Jeff Brenner

Wow...1987 is upon us already, and the 8-bit Atarians are clamoring louder than ever! Let me hear from you, folks, with your ideas for "Applying The Atari" in 1987. Anything goes—applications software, hardware projects, reviews, etc. We've had some terrific programs listed here in 1986, as is evident from readers' responses, and 1987 promises to be equally exciting. This month we'll enter the final part to November's feature program, Forms Generator and we'll also answer some reader mail.

Reader Mail

Dear Jeff:

I have an Atari 800XL and have recently become interested in assembly language programming. I am presently working on a project which involves changing some routines in Atari BASIC. For this reason, I read with interest your column concerning copying the ROM BASIC to disk ("Atari Help," April 1986). Could you print the assembly listing of the program? Also, I would like to add line numbering to Atari BASIC and would appreciate if you could give me some advice about how and where to start this routine.

Gary Harren
Anniston, Alabama

You'll find the assembly listing under the "Disk-Based BASIC" heading. This routine runs as an AUTORUN.SYS file and loads the BASIC language from the file D:BASIC. The routine also contains a special SYSTEM RESET handler. Normally, whenever the RESET key is pressed, a GRAPHICS 0 screen is set up at the top of free RAM. When the BASIC in ROM is being used (internal BASIC on XL/XE or BASIC cartridge), the screen is set up directly below the BASIC ROM, at the top of RAM (in systems with at least 40K memory). But when BASIC is in RAM, as it is when it is loaded from the disk, this screen is set up right on top of a portion of the BASIC language, and causes a system crash. The SYSTEM RESET handler eliminates this problem by automatically replacing 1K of the damaged BASIC code after RESET is pressed.

An additional activity of this routine is to trick DOS into believing a cartridge is present. Normally, when you call up DOS and choose the "RUN CARTRIDGE" option (to return to BASIC), DOS checks if a cartridge is present and will give a "NO CARTRIDGE" message if it doesn't find one. The Disk-Based BASIC routine changes specific memory locations in either DOS 2 or DOS 2.5 whenever DOS is called to make the DOS believe that a cartridge is actually present. This way, the "RUN CARTRIDGE" function returns you to the RAM-based BASIC.

I've added many comments to the assembly listing so you, Gary, and other readers interested in assembly language can see precisely how the above-described functions are implemented. Additionally, I've listed another routine for your interest, under the "BASIC TO STRING CONVERTER" heading. This short routine is used to transfer the BASIC ROM into a string (i.e. A = USR(ADR(1536),ADR($)). The string can then be saved to the disk as the "D:BASIC" file. April's Disk-Based BASIC program used this short routine for exactly this purpose.

Regarding your question about creating an autonumbering program for the Atari, the upper half of page six (location 1792 or $680) is a safe place for the routine (or the entire page six if you need more than 128 bytes). I don't know if you are familiar yet with interrupt vectors, but you would probably want to install your routine into the keyboard handler, or the vertical blank routine. This way you can check when RETURN is pressed or when the keyboard register (764) is cleared (containing a 255 after having contained the internal code for the RETURN key, 12), and then display the next line number. A number of autonumbering routines have already been created and you can probably find one in the public domain, should you decide not to embark on this programming task yourself.

Dear Jeff:

Is there a program somewhere for word processing that uses SCRIPT type of letters? My wife would like to use something like that for some of her correspondence and I said I'd find out. I am enclosing a clipping that has the typestyle I'm thinking of. It wouldn't have to be that exact style but something like it.

Along with my Atari 800XL, I use an Epson Spectrum LX-80 printer. The Epson, as versatile as it is, should be able to do the work if there is such a program available. Many thanks for all the good work and I love to read your column.

Darwin K. Garrison
Olathe, Kansas

I don't know of any Atari word processor that allows the printing of script type (unless, of course, the printer itself supports this typestyle). However, there are still a couple of ways in which you can send out correspondence in cursive print. First of all, you'll need a word processor, such as AtariWriter Plus, that can "print" to a disk file. The original AtariWriter cannot be used for this purpose since it does not support print-

continued on page 112

DISK-BASED BASIC Assembly Listing

```
10 ; BASIC LOADER
20 ; COPYRIGHT 1986 JEFF BRENNER
30 ; Supports SYSTEM RESET, 130XE RAMDISK, and the "RUN CARTRIDGE"
40 ; option on DOS 2 and DOS 2.5.
50 ; When saved as AUTORUN.SYS, will load and execute cartridge file
60 ; saved as "D:BASIC"
70 ; 48K minimum RAM required.
80 ; Page six can be used (if SYSTEM RESET not pressed and RUN CARTRIDGE
90 ; DOS option not used) by resetting $222 and $223.  Original values
0100 ; stored in $6FE and $6FF.  To do this in BASIC:
0110 ; POKE 54286,0:? :POKE 546,PEEK(1792):POKE 547,PEEK(1793):POKE 54286,64
0120  *=$5D7 ; Locations $5D7 to $5FF are used only temporarily for
0130 ; the powerup routine.
0140 MEMLO=$2E7
0150 POWERUP LDA $0C ; This section executed when run for first time
0160  STA INIT+1
0170  LDA $0D
0180  STA INIT+2
0190  LDA #INIT&255
0200  STA $0C         ; Point DOSINI vector to our INIT routine.
0210  LDA #INIT/256 ; INIT will be executed after every SYSTEM RESET.
0220  STA $0D
0230 DOS25 LDX #0
0240  STX 580
0250  INX
0260  STX 9
0270  LDA #160
0280  STA 106       ; Reserve 8K RAM
0290  JSR SCREEN   ; Setup GRAPHICS 0 screen
0300  LSR 709  ; Blank screen while loading
0310  LDY #3
0320  STY $342+$30
0330  INY
0340  STY $34A+$30
0350  LDA #FILE&255  ; FILE holds "D:BASIC" file name
0360  STA $344+$30
0370  LDA #FILE/256
0380  STA $345+$30
0390  LDX #48
0400  JSR $E456        ; Open file
0410  LDA #7
0420  STA $342+$30
0430  LDA #250
0440  STA $344+$30
0450  LDA #159
0460  STA $345+$30
0470  DEC $349+$30
0480  JSR $E456        ; Load BASIC
0490  ASL 709          ; Restore screen
0500  LDA #$77
0510  STA 764          ; Force SHIFT-INSERT to clear last screen line
0520  LDA MEMLO
0530  STA $02
0540  STA HOLD
0550  LDA MEMLO+1
0560  STA $03
0570  STA HOLD+1
0580  CLC
0590  ADC #4
0600  STA MEMLO+1     ; Move low memory pointer up 1K
0610  LDA #DOSJUMP&255  ; Set RUN CARTRIDGE address
0620  STA $BFFA
0630  LDA #DOSJUMP/256
0640  STA $BFFB
0650 CONT LDX #4 ; Temporarily save 1K of BASIC below new MEMLO
0660  LDY #0
0670 LOOP LDA $BC00,Y
0680  STA ($02),Y
0690  INY
0700  BNE LOOP
0710  INC $03
0720  INC LOOP+2      ; Increment high byte of $BC00 at LOOP+2
0730  DEX
0740  BNE LOOP
0750  LDA #$BC
0760  STA LOOP+2  ; Restore original value at LOOP+2
0770  BNE RETURN ; Go to run BASIC
0780 ; The following section is executed each time SYSTEM RESET is pressed:
0790 INIT JSR $0000   ;$0000 is replaced with DOSINI address
0800  LDA #160
0810  STA 106    ; Set RAMTOP back again to reserve 8K
0820  JSR SCREEN ; Open GRAPHICS 0 screen
0830  JSR RESET  ; Restore MEMLO to original value
0840  CLC
0850  ADC #4
0860  STA MEMLO+1 ; Reserve 1K again
0870  LDX #4
0880  LDY #0
0890 LOOP2 LDA ($02),Y ; Restore last 1024 bytes of BASIC
0900 ADR STA $BC00,Y
0910  INY
0920  BNE LOOP2
0930  INC $03
0940  INC ADR+2 ; Increment high byte of $BC00 above
0950  DEX
0960  BNE LOOP2
0970  LDA #$BC
0980  STA ADR+2  ; Restore original value at ADR+2
0990 RETURN LDA $222
1000  STA VB+1        ; Save original vblank routine address
1010  LDA $223
1020  STA VB+2
1030  LDX #NEWVB/256
1040  LDY #NEWVB&255
1050  LDA #$06
1060  JSR $E45C       ; Install NEWVB routine into vblank
1070  JMP $A000
1080 SCREEN LDA #3   ; Subroutine to open GRAPHICS 0 screen
1090  STA $342+$20
1100  LDA #SCHAR&255
1110  STA $344+$20
1120  LDA #SCHAR/256
1130  STA $345+$20
1140  LDA #12
1150  STA $34A+$20
1160  LDX #$20
1170  JMP $E456  ; RTS after $E456 ends this subroutine
1180 RESET LDA HOLD  ; Subroutine to restore original MEMLO value
1190  STA 2       ; Use locations 2 and 3 as a page zero address
1200  STA MEMLO
1210  LDA HOLD+1
1220  STA 3
1230  RTS
1240 DOSJUMP JSR RESET
1250  JMP CONT
1260 FILE .BYTE "D:BASIC",$9B ; File name of BASIC file
1270 SCHAR .BYTE "S" ; "S" used to open to screen
1280 HOLD .BYTE 0,0  ; Reserve two bytes to hold MEMLO address
1290 NEWVB LDA $26F9 ; Vblank routine (executed continuously)
1300  CMP #$FD       ; Check if DOS 2 is being used
1310  BNE NEXTDOS    ; Nope - Check for DOS 2.5
1320  DEC $26F9      ; Make DOS 2 think cartridge is present
1330  BNE VB
1340 NEXTDOS LDA $2759 ; Check if DOS 2.5 is being used
1350  CMP #$FD
1360  BNE VB          ; Nope
1370  DEC $2759       ; Make DOS 2.5 think cartridge is present
1380 VB JMP $0000     ; $0000 is replaced with original imm. vblank address
1390  .END
```

Applying The Atari

continued from page 111

ing to devices other than the printer. When you "print" the file to diskette, you are instructing the word processor to save your text in the exact way it would send the data to your printer. Therefore, your "printed" file will fit your specified margins, will have been centered where instructed to be centered, will number pages in the file, etc. Once the diskette file is in printed form, you could use XLENT Software's MegaFont to print the file with a cursive font. You could also use ATASCII Lister (published in the July 1985 "Applying The Atari), along with a character set of your own design or a public domain script character. Be forewarned, however, that with either of these programs, the characters will probably not be as readable as you would like, since these characters are defined by the same number of bytes (eight) as the standard Atari characters.

Completed Forms Generator

Load your Forms Generator program from November and make the modifications or additions shown under the "Forms Generator Changes/ Additions" heading. (**Important note:** These and the following modifications apply only to those using the listing version of the program. The standard and enhanced diskette versions have already incorporated these additions and should not be modified.)

FORMS GENERATOR "Enter Data" Function

```
IHJ 4560 POKE C559,N0:PRINT CLS$:POKE 53250,N0:POKE 53251,N0:POKE 704,144
FBJ 4570 POKE 53248,120:FOR I=1767 TO 1790:POKE I,144:NEXT I:POKE 712,144
VJJ 4580 POKE 1778,150:POKE 710,154:POKE 752,1:POKE C559,46
CBJ 4590 SHOW$(36,36)=CHR$(21):GRAB$(36,36)=CHR$(21)
WPJ 4600 DX=N0:DY=N1:IX=-4:CALC=N0
KRJ 4610 IF DEF$=NUL$ THEN 4780
BEJ 4620 TOT=N0
NMJ 4630 IX=IX+5:IF IX>LEN(DEF$) THEN 4800
MFJ 4640 OP=ASC(DEF$(IX)):X=ASC(DEF$(IX+N1)):Y=ASC(DEF$(IX+N2))
BHJ 4650 IF CPY THEN Y=CY
IFJ 4660 LN=ASC(DEF$(IX+N3)):TYPE=ASC(DEF$(IX+N4))
LTJ 4670 IF TYPE>47 AND TYPE<55 THEN TYPE=TYPE-48
JTJ 4680 IF TYPE<>67 THEN 4820
ETJ 4690 IF CPY=N0 THEN 4720
RSJ 4700 IF IX>=CPYH THEN CPY=N0:GOTO 4630
BIJ 4710 IX=IX+5:GOTO 4640
OQJ 4720 CPYH=IX:CPY=N1:CY=Y:IF IX>5 THEN IX=IX-5
GDJ 4730 IF DEF$(IX,IX)=SP1$ AND DEF$(IX+4,IX+4)<>"C" THEN 4750
BNJ 4740 IX=IX-5:GOTO 4730
CAJ 4750 Y=ASC(DEF$(IX+N2))
SNJ 4760 IF IX>5 THEN IF ASC(DEF$(IX-3))=Y THEN IX=IX-5:GOTO 4760
FXJ 4770 GOTO 4640
OGJ 4780 POKE 53248,N0
IUJ 4790 POSITION 10,11:PRINT "NO DATA IN MEMORY":GOTO 4470
JJJ 4800 POSITION 10,21:PRINT "ALL DATA ENTERED";
IUJ 4810 POSITION N0,22:PRINT SP$(N1,39):POKE 84,21:GOTO 4470
DIJ 4820 POSITION N0,22:PRINT CHR$(31);CHR$(30);:GOSUB 1280
JPJ 4830 IF TYPE=C84 THEN 5210
LPJ 4840 POSITION 19,11:IF OP=61 THEN A=TOT:TOT=N0:GOTO 5040
JRJ 4850 IF TYPE<>70 THEN 4960
FDJ 4860 INPUT #N3;A$:A$(LEN(A$)+N1)=SP$
PVJ 4870 IF A$(N1,N1)="$" THEN A$=A$(N2,LEN(A$))
OZJ 4880 TRAP 4890:A=VAL(A$(1,LN)):GOTO 4900
RTJ 4890 A=N0:TRAP 4430
HBJ 4900 IF OP=32 THEN TOT=A
SIJ 4910 IF OP=43 THEN TOT=TOT+A
SNJ 4920 IF OP=45 THEN TOT=TOT-A
SIJ 4930 IF OP=42 THEN TOT=TOT*A
STJ 4940 IF OP=47 THEN TOT=TOT/A
FWJ 4950 GOTO 4630
WBJ 4960 TRAP 4430:POSITION N0,22:PRINT SP$(N1,39):POSITION N0,22
XKJ 4970 PRINT "ENTRY:";:LIMIT=19:GOSUB 5360
COJ 4980 POKE 752,N1:POSITION 19,11:PRINT SP$(N1,LN);:POSITION 19,11:TRAP 4960
SRJ 4990 IF A$<>NUL$ THEN A=VAL(A$):GOTO 5040
EGJ 5000 IF CPY=N0 THEN A=N0:GOTO 5040
EQJ 5010 IX=CPYH
CBJ 5020 IF ASC(DEF$(IX+N4))=67 THEN IX=IX+5:IF IX<LEN(DEF$) THEN 5020
TSJ 5030 IX=IX-5:CPY=N0:GOTO 4630
XDJ 5040 TRAP 4430:IF TYPE=N0 THEN A=INT(A+0.5):A$=STR$(A):GOTO 5140
USJ 5050 DM=N0:IF TYPE=36 THEN TYPE=2:DM=N1
JOJ 5060 IF TYPE<>78 THEN 5090
MMJ 5070 IF A$(LEN(A$))=CHR$(32) THEN A$=A$(N1,LEN(A$)-N1):GOTO 5070
FNJ 5080 GOTO 5130
FHJ 5090 IF TYPE<1 OR TYPE>5 THEN 5430
LLJ 5100 A=INT(A*(10^TYPE)+0.5)/10^TYPE:A$=STR$(A):I=LEN(STR$(INT(A)))+N1
ILJ 5110 IF A=INT(A) THEN A$(LEN(A$)+N1)=".":I=LEN(A$)
NRJ 5120 IF LEN(A$(I-N1))<TYPE+N2 THEN A$(LEN(A$)+N1)="0":GOTO 5120
EVJ 5130 IF LEN(A$)>LN THEN A$=A$(N1,LN)
VYJ 5140 I=LEN(A$):T$=A$:A$=SP$(1,LN)
TLJ 5150 IF DM=N0 THEN A$(LN-I+1)=T$:GOTO 5180
YYJ 5160 IF (LN-I)>N0 THEN A$(LN-I)="$"
MMJ 5170 A$(LN-I+1)=T$
KHJ 5180 A$=A$(N1,LN)
PZJ 5190 PRINT A$;:A=USR(ADR(GRAB$),ADR(DAT$),Y*120+X)
FRJ 5200 GOTO 4870
UOJ 5210 POSITION N0,22:PRINT SP$(N1,39):POSITION 14,22:PRINT "ENTER DATA"
AEJ 5220 POKE SK,255:XI=X
XGJ 5230 POSITION 19,11:POKE SK,255
IDJ 5240 POKE 694,N0:GET #N1,N
YNJ 5250 IF N=155 THEN 4630
ASJ 5260 IF N>31 AND N<125 THEN PRINT #N2;CHR$(N);:XA=XA+N1:GOTO 5300
SCJ 5270 IF X>XI AND (N=126 OR N=30) THEN 5290
FRJ 5280 GOTO 5240
WIJ 5290 X=X-N1:A=USR(ADR(SHOW$),ADR(DAT$),Y*120+X):PRINT #N2;SP1$
DAJ 5300 POSITION 19,11:A=USR(ADR(GRAB$),ADR(DAT$),Y*120+X)
DAJ 5310 X=X+XA:XA=N0:IF X>79 THEN X=N0:Y=Y+N1
KFJ 5320 Y=Y+YA:YA=N0:IF Y>48 THEN Y=N1
RJJ 5330 A=USR(ADR(SHOW$),ADR(DAT$),Y*120+X)
KEJ 5340 IF X-XI>=LN THEN 4630
FPJ 5350 GOTO 5240
BBJ 5360 POKE 752,N1:HX=PEEK(C85):POKE C85,HX+LIMIT:PRINT CHR$(25);
VTJ 5370 POKE C85,HX:POKE 752,N0:PRINT CHR$(30);CHR$(31);
KCJ 5380 POKE 694,N0:POKE 702,64:GET #N1,N
NOJ 5390 IF PEEK(93)=89 THEN 5420
GCJ 5400 IF N<>155 AND N<>156 AND N>128 THEN N=N-128
UYJ 5410 IF N>30 AND N<125 THEN PRINT CHR$(N);
QOJ 5420 IF N=126 AND PEEK(C85)>HX THEN PRINT CHR$(N);
ONJ 5430 IF N=30 AND PEEK(C85)>HX THEN PRINT CHR$(N);
CAJ 5440 IF N<>156 THEN 5460
CIJ 5450 POKE C85,HX:PRINT SP$(1,LIMIT);:POKE C85,HX:PRINT NUL$;:POKE SK,255
CCJ 5460 IF N<>155 THEN 5380
FFJ 5470 POKE C85,HX:INPUT #N3;A$:A$=A$(N1,LIMIT)
KQJ 5480 IF A$=SP$(N1,LIMIT) THEN A$=NUL$
MMJ 5490 POKE 752,N0:PRINT NUL$;:RETURN
KRJ 5500 PRINT CHR$(125):POSITION N2,N2:POKE 842,13
SBJ 5510 POSITION N2,N2:FOR I=480 TO 660 STEP 10:PRINT I:NEXT I
VKJ 5520 PRINT 680:PRINT "CONT";:POSITION N2,N0:STOP
SKJ 5530 POSITION N2,N2:FOR I=690 TO 880 STEP 10:PRINT I:NEXT I
PTJ 5540 PRINT 890;CHR$(32):PRINT "CONT";:POSITION N2,N0:STOP
JBJ 5550 POKE 842,12
DSZ 5560 RETURN
```

SAVE the partially updated Forms Generator. Now load Program Perfect and use it to enter lines 4560 through 5560 under the "FORMS GENERATOR Enter Data Function" heading. These lines add the "Enter Data and Calculate" feature to Forms Generator. When these lines have been entered, LIST them temporarily to disk (i.e. LIST "D:TEMP"). Now, load the partially updated Forms Generator (with the changes/ additions incorporated) and ENTER the temporary file (i.e. ENTER "D:TEMP"). The result will be the complete standard Forms Generator program in memory, and you can now SAVE this program under a name of your choice.

Program Changes

After you've entered the additions and modifications (lines 25 to 3760), you will notice a difference when Forms Generator is run: Before the "PLEASE STAND BY" message appears, a column of numbers is displayed, twice, and the cursor will be seen moving from the top to the bottom of the screen. Actually, what is happening is that the program is deleting some of the initialization lines of the program. This frees up enough memory for the rest of the program, along with the added "ENTER DATA" function, to operate. Once the lines have been deleted, the program displays the "PLEASE STAND BY" and then operates as normal. However there is one important note you should be aware of: Once you have run the updated Forms Generator, do not SAVE it. Since many lines of the program essential to the initialization procedure are deleted to free up more memory, you will be saving an incomplete program. Therefore, if you discover you need to make additional changes to the program after you run it, first load in the complete program, make the changes, and save the program before running it.

Another change made in the program is the replacement of the CONSTANT definition with the FORMS definition (used in the DEFINE CALCULATIONS mode). Essentially, the two definitions are equivalent; the name was changed to more accurately reflect the function of the definition. When you are defining calculation and want to incorporate a constant that appears on the form, you would now type F instead of C for the "DECIMAL PLACES, N, $..." prompt. Hence, if you want to multiply a subtotal on a form by a tax percentage, you would define the tax amount (such as .06) as a FORMS variable—signifying to the program that the value is taken from the form itself and not from user input.

The more important reason for the name change, however, is that values that Forms Generator itself places on the screen can be used in future calculations. For example, let's say you define the first line of your form as quantity * unit price = extended price. Then you copy this definition for the next 30 lines of your form (by pressing "C" for the "COMMAND OR RETURN TO MARK FIELD BEGIN" prompt). When you later enter the quantity and unit price information for each line, Forms Generator will automatically calculate the extended price and place it on the form. Hence, you can tell Forms Generator to sum up the extended price column to give you a subtotal or total. To do this, you would go back to each extended price box and define it now as a FORMS variable, while adding them together. This tells Forms Generator to go back and take the value that it put in the extended price box and use that in an additional calculation (calculating the total).

One other feature added: When you have a form with a lot of lines of "copied" definitions, but have finished entering your data, simply press RETURN to the ENTRY prompt and Forms Generator will skip the remaining copied lines. For example, if you copied thirty lines of the quantity * unit price = extended price formula, but only have four lines of information to enter, you would type in the data for those four lines and then press RETURN by itself. Forms Generator will then bypass the remaining copied lines and will proceed with the next definitions (such as calculating a subtotal).

Using "Enter Data" Function

This function enables you to actually enter the data according to the calculation definitions you defined. For numerical definitions, you'll see an "ENTRY" line on the bottom of the screen. Type in your entry and press RETURN. The value will be reproduced on the form in its proper format. As you enter the necessary data, the defined calculations will be performed and the results will appear on the form. For text definitions, the cursor will be positioned on the form itself, allowing you to type the text directly onto the form at the specified position.

Notes on Defining Calculations

Defining calculations for a form can get quite complicated, and unless you are experienced with defining formulas (in programs such as VisiCalc, SynCalc, etc.) you will probably want to practice and experiment to best learn how to properly and efficiently define calculations for your forms.

And a note for more experienced users: If you are creating a complicated form, with numerous calculation-definitions, it is wise to save your form (definitions are automatically saved with the form) after every major string of operations. This way, in the event that you accidentally enter an incorrect formula, or make any mistake, you can always reload the form and begin where you last saved the definitions (by selecting ADD after choosing the DEFINE CALCULATIONS option).

Next Month

We'll give the completed Forms Generator a practical test by entering a programmed form. Another form will be included that takes advantage of the graphics capabilities of the enhanced diskette-version of Forms Generator. Plus, we have a special hardware project for you loyal 800 owners, thanks to Roger E. King of SPACE (Harrisburg, Pennsylvania). (More reader mail too!)

Readers' questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope (SASE) for a personal reply. Due to volume of letters received, only a selected number of personal responses can be given each month.

The Forms Generator program disk, from the November 1986 issue is available for *Computer Shopper* readers from the author for $7.00 for the standard version, or $11.00 for the enhanced version with documentation. Please make checks payable to "Jeff Brenner" and specify your disk drive model.

"Program Perfect" is a utility used to check for typing errors while entering programs from this column. Readers can send $5 for a diskette or a SASE for a listing of this program.

Address all correspondence to: Jeff Brenner, "Applying The Atari 1/87", c/o *Computer Shopper*, P.O. Box F, Titusvillle, FL 32781-9990. ●

Hacking the ST

by Wynn Rostek

Last month we showed the Setscreen XBIOS call. One of the problems with the Setscreen call was that the operating system always performed a clear screen after each Setscreen call. I promised to go over switching the screen display area this month, so here goes.

To actually switch the screen display area, we need to look at the way the ST goes about generating a display. As you know if you have been following this column, the ST uses a bit-mapped display.

For those of you who may not have heard the term before, a bit-mapped display is one where each pixel on the screen is actually one or more bits of memory. In the old days, the memory used for holding the text displayed on a terminal was very small. The characters that were sent to the terminal were stored in a small buffer that was only about 2K! Keep in mind, these were the days when memory was very expensive.

Each character received was stored in one of the bytes of memory, in ASCII form. When the time came to display a pixel from one of the characters in memory, the ASCII value formed part of the address that was supplied to a ROM. The other part of the address was the scan line number, or rather the lowest 3 bits of the scan line number.

With a 5 by 7 matrix, the ASCII character in memory location 0 of our hypothetical terminal has to generate 7 lines, each 5 bits long. The terminal actually generates 8 lines of 6 bits, to allow some space between characters.

On scan line 0, the ASCII character in memory location is input as an address along with the three low bits of the scan line number. The ROM outputs 6 bits, and each is sent to the CRT. The terminal then uses the next 63 bytes of memory in the same manner. We are then back to using the ASCII character in memory location 0 and scan line 1 as the input to the ROM.

Figure 1 shows a way of dividing up the address lines so that we can generate a proper display. The important thing to note is that the ASCII character stored in memory location 0 is used 8 times to generate the display. This allows us to show 16 lines of 64 characters in 8 by 6 pixels using less than 2K! This is a total of 49152 pixels generated from less than 16384 bits of RAM.

While using a ROM to store the actual bit pattern of the characters helps save on RAM, we are limited in the characters we can display. In a bit-mapped display we have one bit of memory for each pixel. When a bit of memory is a 1, a dot appears on the screen.

This means that instead of decoding the character each time a pixel is needed, we decode the character once, and set the bits in memory as needed. The disadvantage of this approach is that we need more RAM for the same number of displayed characters but now since we are using a single bit of memory per pixel, we can draw lines!

Since RAM has become so cheap, most all systems today use the bit-mapped display technology. With a bit-mapped display there are two important memory addresses the system needs. The first address is the address where the bit map starts in memory, and we also need an address where the bits are being turned on when something is written to the screen.

In most systems, the address of the display buffer (the bit map) is fixed by the system. The IBM PC and most clones use this approach. In the ST, the bit map can be anywhere in memory.

To set the starting address of the bit map, two bytes are written to hardware registers within the ST. The address used for the bit map is actually 24 bits long, but the ST assumes that the bit map occurs on page boundary. If the address occurs on a page boundary, it is a multiple of 256. Any multiple of 256 has the lower 8 bits of the value as 00 hex, so the extraneous 00 is not stored (saving a register in expensive custom chips).

The second and third bytes of the address are not 0, and these must be written to a hardware register for the system to display the bit map.

Unlike many systems, the ST can display one bit-map, while writing to another. The two hardware registers are used to designate the address of the bit map that the ST displays, but a memory location is used to specify the bit map area that is to be written to.

Listing 1 (pg. 242) is a program to show the ST using two different bit maps. Notice that we switch the bit map by performing pokes to different addresses. The high addresses (ffffxxx hex) are really the hardware register addresses in the ST. Listing 2 (pg. 242) shows some assembly language routine used in this program. The peek and poke functions shown here are run in the supervisor mode so you avoid the infamous "2 Bombs" syndrome.

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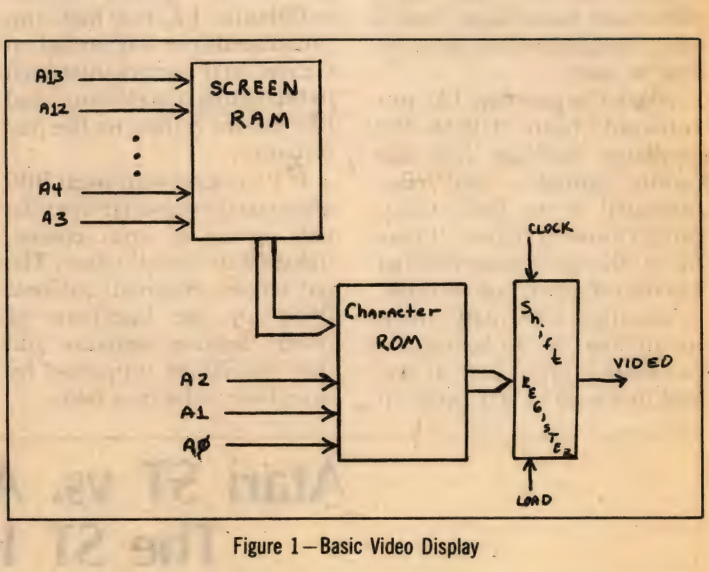
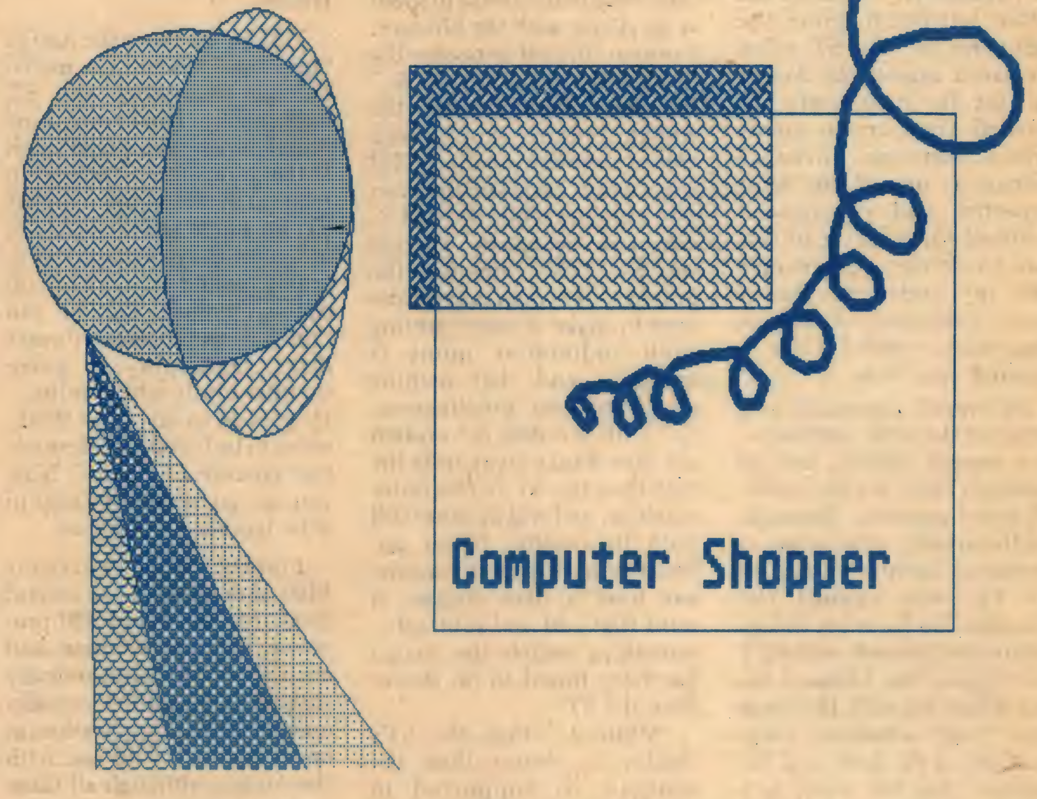


Figure 1—Basic Video Display

Degas Elite From Batteries Included



by John J. Anderson

There are a few disks which are software essentials in any Atari ST library. One is a word processor, another a telecommunications program, yet another is a paint program of some kind. After all, what's a computer like the ST for if you can't get some eye-popping graphics on the screen?

When it comes to paint programs for the ST, although there are a number of choices out there, the original Degas package from Batteries Included quickly emerged as the program of choice. It was truly impressive in its graphics capabilities, yet was easy-to-learn and easy-to-use. It was able to work in both color modes as well as monochrome mode, and offered features that outstripped every other package available. Without Degas, no ST software library could truly be called complete.

And yet, there were a number of quiet omissions in Degas, which limited its capabilities quite a bit. Four omissions could be called critical: There was no zoom or magnification mode, no scaling potential, no ability to rotate blocks, and no space for primitives to reside. Even lacking these, the program was still very good. But if these important features could somehow be incorporated…

After a wait that seemed at times interminable, Batteries Included has finally brought us Degas Elite. It includes all the features listed above, plus a whole lot more. It is more

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CP/M For The Atari ST

by W. Krieger

As I write this it's the end of October, and I've just received what I consider a Christmas present from Atari Corporation. The long awaited CP/M emulator is in my hands and it didn't cost me a dime. And if you want one you can get it for free as well.

Atari Corporation has just released their CP/M-Z80 emulator package into the public domain. And they uploaded it to both CompuServe and to GEnie. It may be on other services as well, but I know for sure it's up on these.

The file is CPM.ARC and is an archive file. So before you can start playing with it you will first need to "DE-ARC" it by using ARC.TTP. Which is available on both GEnie and CompuServe as well.

Of course the day it showed up on the commercial services it also started to show up on private BBSs. I know of three in Orlando, FL. that had it up the same day it was posted on GEnie. So if you are interested in this system check your local BBS before getting on the pay systems.

If it's not on your local BBS after you download it from the pay service of your choice, upload it to a local system. The pay services are great, but local BBSs are the backbone of public domain software and they should be supported by everybody who uses them.

What the CP/M-Z80 emulator is, is a software package that allows your Atari ST to run programs written for the CP/M systems, which use either an 8080 or a Z80 CPU.

You can think of it as a Z80 machine language interpreter running on your ST's 68000. It's of course slower than a real Z80 because every instruction needs to be translated to 68000 machine code. Only the speed of the 8Mhz 68000 of the ST makes this practical.

Once the 68000 can run Z80 code it's a simple matter to implement CP/M. CP/M is just another program that was written for the 8080 Z80 family of microprocessors.

Prior to the introduction of the IBM-PC, CP/M was the major disk operating system available for microcomputers. There were and still are thousands of CP/M systems in use. And of course to support these systems there is an impressive software library available for CP/M systems.

The CP/M public domain is amazing. I think that out of all the popular operating systems that have larger public domain libraries, MSDOS, Apple II, Atari 8-bit, etc., that the CP/M public domain has the widest selection, and the best quality.

One of the reasons for this is that CP/M was first. It's been around longer and has had more time to grow. Also in the early years of micro based systems, hackers and hobbyist were the market.

There wasn't perceived to be any real money to be made writing programs for micros, so the people who were writing programs at that time were writing them because they wanted to make their system do something it had never done before.

After they had gotten their program written they wanted to show it off and have others use it. They didn't market it, they gave it away, usually with source code! Which of course was hacked on and improved by everyone in the tight microcomputer community of that time.

Another reason for the strength of CP/M public domain software is that many companies don't see this as a viable market anymore and rather than market and to support their CP/M products they too have released some formally commercial products into the public domain.

I don't mean to imply that all CP/M programs are public domain, far from it. Many companies still consider CP/M as a good market and support it. You can still buy Turbo Pascal, Wordstar, dbase II, and many other programs for CP/M systems.

CP/M is far from dead, and thanks to Atari's CP/M-Z80 emulator ST, owners can now tap into the potential of this mature and viable operating system.

The first thing you need to do to use the emulator is to make some CP/M format disks. TOS and CP/M use completely different directory formats so TOS can't read CP/M disks and vice versa.

Included in the emulator package is a program MAKECOM.TOS this is used to make what the documentation refers to as a pseudo CP/M disk. It will be used to make real CP/M disks. This disk will also have two special programs on in INIDSK.COM and TOSCPM.COM.

Once you have made your first disk under TOS the rest of the process is run from under CP/M. Just run the emulator program and when prompted to insert your pseudo CP/M disk hit return.

You are now running a CP/M system. The only difference I've seen between the emulator and my "real" CP/M system is that instead of getting A> or B> as a prompt the emulator uses A: or B:.

Now is when INIDSK and TOSCPM come into play. IN-

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Atari ST vs. Amiga Round 2 The ST Is Superior

by D.F. Scott

There's been a lot of response to Sheldon Leemon's article in *Computer Shopper's* November issue called "The Myth of ST Superiority," wherein the author sets out to prove the arguments for the ST when compared against the Amiga are, for the most part, unfounded. The article merits strong response, because Leemon is one of the most respected and experienced technical writers in the profession. I read the article closely with my acclaimed photon stereo optiscopes, and took some notes, which I'd like to expound upon here.

My overall impression as a writer in the same profession: One cannot dispute any of Leemon's facts, it's his reasoning that I question. Throughout the article, he indulges in a personal diatribe not against the ST, but against the Tramiels. He bases his Amiga facts on the textbook and his ST facts upon what Leonard has said or Sam has said. He jumps upon their occasional exaggerations of the facts as if the machine they sell were, as a result, somehow at fault. Leemon, when pressed to find selling points for the Amiga, naturally turns to the subject of graphics at every opportunity—one strong point of a machine otherwise surrounded by weak points. But perhaps most importantly, at no time does Leemon prove that any of the five statements he claims are "myths" are unfounded or wrong! Instead, he took the facts and colored them to suit his deadline.

Specific instances: "Myth 1," for instance, that the ST is faster than the Amiga. Here, as almost everywhere else, Leemon jumps onto the subject of graphics; while barely mentioning the fact that it is the Amiga which has the "bimmer" chip that's meant to speed it up. Even with the bimmer, Leemon himself concedes the ST is faster by "at best 15%." He does correctly state the Amiga's custom co-processor chips, although stealing CPU time only occasionally, can plot graphics while the CPU is otherwise occupied; whereas the ST's CPU handles the graphics—Leemon exaggerates here to make it seem plotting each individual point is trudgery—and that nothing else can happen "simultaneously." Still, this does not explain nor does it take away from the fact that the ST is the faster machine, and will be faster still with its coming blitter enhancement. Before a machine can have a ritzy display, it must first add and subtract—something which the Amiga has been found to do slower than the ST.

"Myth 2," that the ST's display is clearer than the Amiga's, is supported in Leemon's mind by the fact that one can buy a better monitor, a TV, or even a big-screen projection system that will show off the versatility and clarity of the Amiga display—in other words, if you don't like the Amiga display, go buy a Sony. With the ST's super-clear RGB, who wants to buy another monitor or use their bleeding TV set?

"Myth 3" is that the Amiga's OS is bug-ridden, to the extent that the machine is totally unprogrammable. Of course that would be a myth; somebody has to program the darned thing! Leemon's contention is that ST GEM being bug-ridden in places somehow evens the score, thus neutralizing all of the Amiga's notorious OS bugs. Hmmm.

Yes, we all know the Amiga "Intuition" OS has the multitasking capability the ST doesn't have. I've known some programmers here who'd laugh at that term "multi-tasking" in relation to the Amiga (and the ST, for that matter) because of how slow the multitasked programs would run. Leemon claims, though, that he can "run a word processor, format disks, and play a game simultaneously while on-line." He goes on to say, "Just think, never to be bored by a slow online conference again." Now you can guess what he's up to if he ignores you on-line.

Frankly, the way I have my Flash disk set up, I can format disks, run the Word 400 processor, and still be online, and even if it were electronically supported I couldn't actually *operate* all three applications at once! Neither could one with the Amiga; although all three applications are running (in Leemon's case, four if you count Arctic Fox or whatever), one can—and should—input to only one application at one time. Multi-tasking is multiple output, not multiple I/O; thus it's not for general-purpose systems, but for major operations like CAD/CAM. Multitasking is only really useful when the programs operating under such an environment are actually doing something even while you're not inputting data to them.

"Myth 4" is that there's more software for the ST than the Amiga, as proven by software catalogs. Perhaps Leemon's reading the *Electronic Arts* catalog; but I'll be glad to show him some from such major distributors as Ingram and C.S.S. where ST software outnumbers Amiga by as much as six to one.

"Myth 5" is that the Amiga is a game machine. Here we see the same double-standard approach other writers have taken to defend the ST—that the label is unfair for such a powerful machine as the Amiga, but on the other hand it plays some awesome games. Both the ST and the Amiga play awesome games, as they should; and I do agree that game software has to be faster, tighter, and more complex than business software—so the better game machine is the better business machine. Still Leemon bases his facts upon what Sam Tramiel has said; which leads me to state if Leemon really wanted to prove the ST inferior, he should have taken off the cover first. He puts Sam down for building a game machine, as well as speaking of the Amiga as such; when in fact Leemon agrees with him.

I like the ST for what it can do for me. I have no doubt that others will prefer the Amiga for what it can do for them. If I say the ST is superior to the Amiga, it is based upon my personal experience with both machines, not what Leonard Tramiel or Frank Leonardi may have said to someone writing an article. If someone is to make an opposing claim to superiority, he should base his facts upon what holds water and not what floats on air. ●

Market Trend Analyzer

by Fred Blechman

Eureka! I found it! A way to outwit the Wall Street moguls with my Sanyo 55X or IBM PC! This program, written in plain-vanilla Microsoft BASIC, will RUN (or can easily be translated to RUN) on most microcomputers. However, I used my Sanyo MBC 555 because I have high-resolution graphing and screen-dump programs I don't have for my PC/XT clone.

I don't know if you've ever bought stocks or bonds or mutual funds, and then watched the whip-sawing Dow Jones daily averages turn you into a whimpering, simpering nervous wreck. I have, and I don't like having my share values manipulated by the big traders. I also don't like being at the mercy of the daily news and the frenzied buying or selling that results from rumors. Nor do I have the time or interest to become an "expert" (especially since the experts seem to make as many mistakes as I do...)

So, for safety, I've put my major capital into Money Market Funds that invest only in U.S. Government-backed paper. These provide preservation of principal with virtually no risk, great liquidity, and some growth. The value can only increase—it can't go below what you put in. In effect, you share in the interest the fund receives from their holdings.

However, in the last couple of years the interest offered by these funds has become very low—currently less than six percent. This isn't much better than a bank or savings and loan (but much safer!).

There are times the market does well, and you can do a lot better with stock mutual funds of various types, if you accept the risk that the value of your fund shares can drop below what you invested. Hmmm-mmm. If there were only a way to know when to "bail-out" of the dropping stock funds and transfer everything to safe money market funds, and when to buy stock funds while they're climbing...

Obviously, you could watch the Dow (perhaps the WORST indicator) and jump in and out of the stock funds every few days. The transfer restrictions on some funds, and the time and paperwork involved to make frequent changes, make that approach impractical. Even the more flexible telephone switching has its practical limits for frequent transfers.

What I was looking for was a signal that I could look at just once in a while—say, weekly—that would tell me when to buy or sell. I'd heard of 50-day moving averages, and 200-day moving averages, but didn't know how to calculate or interpret them.

"Beat the Market" Seminar

So it was particularly appropriate that I went to a seminar recently that covered this subject in detail. Eli Pereira, the "expert" seminar leader, conducted the seminar, and discussed his investment philosophy of switching between money market and stock funds, based on various indicators. I found his 22-page booklet, *How To Beat the Market With Switch Funds*, easy to follow and absolutely fascinating. He stressed the ease of using weekly published data to plot a trend curve, and then switching only when the trend curve clearly showed a change from up to down—or visa versa.

I loved it, not only because my philosophy agreed with his, but because he provided a formula for plotting a trend curve, and discussed the interpretation of the curve to indicate buy/sell signals.

Fund Smoother Program

The very next day after the seminar I wrote the program in Listing 1 to calculate the "smoothing curve" (trend line) for weekly share values. I used the actual weekly net asset values of the Twentieth Century Growth Funds from 8/3/79 to 5/30/80 as input to the program.. I then specified a 50-day smoothing period with a $10,000 initial investment in a money market fund.

The program calculated and tabulated the trend value and present value (including a constant 10.4% interest while "parked" in the money market fund between excursions into the growth fund). The program also announced BUY and SELL signals (after ten weeks of curve-initializing) based on curve geometry, and even allowed for a stock distribution. This is shown in Table 1.

Then I used my Sanyo with Master Graph (MichTron, 576 S. Telegraph, Pontiac, MI 48053. Phone: 313-334-5700, $89.95) to input both the weekly share values and the calculated 50-day trend curve for 20 weeks (11/2/79 to 3/14/80). The color display was gorgeous! However, my early version of Master Graph did not support my particular dot-matrix printer for a screen dump, so I used MichTron's Freeze Frame ($39.95) to produce Figure 1. (It was necessary to set all the Freeze Frame color intensities to maximum—done within a program menu—to equalize the screen dump for all colors.)

"Well," you say, "that's all

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LISTING 1

```
10 REM ************************************************
20 REM *          "Market Trend Analyzer"             *
30 REM *  (For IBM PC/Compatibles/Sanyo MBC 550/555)   *
40 REM *     (C) Copyright Fred Blechman 1986         *
50 REM ************************************************
100 CLS
110 PRINT:PRINT:PRINT"                        Market Trend Analyzer":PRINT
120 PRINT"     This program is designed to accept weekly mutual fund or stock sh
are"
130 PRINT"prices and provide a calculated smoothed curve. Whenever the smoothed
curve"
140 PRINT"drops below its last value a SELL signal is issued. Whenever the smoot
hed"
150 PRINT"curve turns upward from its last value a BUY signal is issued."
160 PRINT
170 INPUT"Starting Amount ($)";A
180 INPUT"How many curve smoothing days";N:S=INT((10/N)*1000+.5)/1000
190 INPUT"Data filename (8 characters max.  .DAT will be added)";N$
200 PRINT
210 PRINT"Which of these things would you like to do?"
220 PRINT"     (1) Start or continue a file?"
230 PRINT"     (2) Printout an existing file?"
240 PRINT:INPUT"1 or 2";C:IF C=2 THEN GOTO 400
300 CLS
310 REM * INPUT DATA *
320 PRINT:INPUT"What is the new date (MM/DD/YY or ZZZ to end)";D$
330 INPUT"What is the fund value per share";V
340 Q$="":INPUT"Has there been a DISTRIBUTION? (Y/N)";Q$
350 INPUT"What is the current Money Market Fund interest (%)";I
360 IF D$="ZZZ" OR D$="zzz" THEN GOTO 400
370 OPEN"A",#1,N$+".DAT"
380 WRITE#1,D$,V,I,Q$
390 CLOSE:GOTO 310
400 REM * Printout Module *
410 PRINT:INPUT"Printer Tabulation? (Y/N)";P$
420 IF P$="Y" OR P$="y" THEN PR=1
430 CLS:IF PR=1 THEN PRINT"           TURN ON YOUR PRINTER!"
440 INPUT"Title for tabulation";T$
450 PRINT N;" smoothing days."
460 PRINT"$";A;" starting value."
470 IF PR=1 THEN LPRINT"               ";T$;" for";N;"smoothing days."
480 PRINT"DATE","VALUE/SHARE","TREND VALUE","SHARES","PRES.VALUE ($)"
490 IF PR=1 THEN LPRINT"DATE","VALUE/SHARE","TREND VALUE","SHARES","PRES.VALUE (
$)"
500 OPEN"I",#1,N$+".DAT"
510 COUNT=1
520 INPUT#1,D$,V,I,Q$
530 IF Q$="Y" OR Q$="y" THEN GOTO 1200
540 IF COUNT=1 THEN T=V
550 TN=T+(V-T)*S:TN=INT(TN*10000+.5)/10000
560 IF COUNT>10 AND TN>T THEN GOTO 1000
570 IF COUNT>10 AND TN<T THEN GOTO 1100
580 T=TN:VO=V:IF BUY=2 GOTO 610
590 IF COUNT>10 AND BUY=1 THEN SHARES=ACCT/V:BUY=2
600 IF COUNT>10 AND SELL=1 THEN SHARES=0:SELL=2
610 IF SHARES=0 THEN ACCT=ACCT+(ACCT*(I/36500!))*7
620 IF SHARES>0 THEN ACCT=SHARES*V
630 IF COUNT=1 THEN ACCT=A
640 COUNT=COUNT+1
650 PRINT D$,V,TN,SHARES,ACCT
660 IF PR=1 THEN LPRINT D$,V,T,SHARES,ACCT
670 IF EOF(1) THEN CLOSE:END
680 GOTO 520
1000 REM * BUY SHARES *
1010 IF BUY=2 GOTO 580
1020 PRINT"CURVE UP! BUY!!"
1030 IF PR=1 THEN LPRINT"CURVE UP! BUY!!"
1040 BUY=1:SELL=0:GOTO 580
1100 REM * SELL SHARES *
1110 IF SELL=2 GOTO 580
1120 PRINT"CURVE DOWN! SELL!!!"
1130 IF PR=1 THEN LPRINT"CURVE DOWN! SELL!!!"
1140 SELL=1:BUY=0:GOTO 580
1200 REM * Distribution Recalculation of Trend *
1210 PRINT:INPUT"What is the distribution value per share";D
1220 P=D/VO:TC=T-(T*P):T=TC:BUY=1
1230 IF PR=1 THEN LPRINT"DISTRIBUTION OF SHARES! VALUE=";D
1240 GOTO 540
```

(END OF LISTING)

The Silver Box

by Richard Fujita

The U.S. Just Won The War, True?

The Electronic News in September, 1986, reported the rapidly rising prices of the 256K DRAMs in the month of August, because the U.S. won the Semiconductor War against the Japanese. The U.S. semiconductor manufacturers have gotten together to knock down the competition from Japan, fair or malicious. The result was a joint agreement with the Japanese companies to fix the price of 64K and 256K DRAMs at an artificially high level in exchange for dropping a prohibitive surcharge on the imported ICs as proposed by the U.S. Commerce Department.

The news was generally welcomed by the American businessmen as a victory. Any victory is better than losing a war, isn't it? But, the real loser may not be the Japanese. The price of some 256K DRAMs in the United States has gone up from about two dollars to a whopping eight dollars according to the report. The Japanese computer companies enjoy the same two dollar low price for DRAMs. In fact the price may still go lower because of the depressed export market.

The net result was higher production cost for the American computer makers and much lower cost for the Japanese and other overseas computer companies including the ones in Taiwan and Korea, the countries which produce give-away priced computers!

Everything has a price. Even time has a negative price, that is, more time is less as long as computers are concerned.

After the installation of Michigan Software's speed board now called 555S in my Silver Box, my other computer, the Clumsy Clone (IBM PC clone) became a slow machine in a relative sense. The clone became so slow, to my relative senses, that it is enough to start irritating me in every phase of word processing jobs.

Then I saw an advertisement in the *Computer Shopper*. An 8 MHZ IBM-compatible turbo motherboard was advertised for the price of a speed-up board! The board looked fine, though it was not a four-layer job. The multiple-layer board has ground and logic power planes sandwiched, and the distributed capacitance with low impedance of the power lines provides low noise power to the chips. On the test bench, the bare motherboard operated a little erratically but, once installed inside the cabinet, its operation was quite error free. So, I now have a functioning spare board for the Turbo Clumsy Clone.

The expense for this speed is about the same in the case of the Silver Box as for the clones. The V20-8 running at 7.3 MHZ performs at more than three times the speed of the standard 8088 in the Sanyo 555. The speed improvement is better than the factor of two, the rate of the increased speed of the CPU clock, partly due to the Sanyo hardware design and partly due to the increased execution speed of the V20. For word processing applications, this faster speed is appropriate and acceptable.

The next step in the time-warping game is to use a high speed cache memory. In this mode, you transport part of the code being used into the cache, which has a short access time, say 50 nanoseconds (ns). With this access speed and the cache memory directly connected to the CPU, it can run hand in hand with an imaginable V20 running up to about 29 MHZ without wait period.

No doubt, if you are a serious user, your next computer in the next three to four years may use this technique employing perhaps 20 MHZ V60/V70 if NEC was successful in marketing the CPU.

There will be no noticeable wait for any operation. Every phase of operation will become an instant! The only exception to this will be in the areas of high resolution graphics which will remain relatively slow and expensive. The CADAM program on the most advanced IBM PC, the IBM PC/RT computer, takes a few minutes to draw a simple, 3D figure having about 50 nodes; 50 lines and arcs. The realm of CAD is rapidly becoming part of the daily routine for many professional and lay engineers replacing their drawing boards.

The plotters necessary to output the result of a CAD program had been priced tens of thousands of dollars, but that is no longer true. In 1985, Brother of Japan started to sell a portable plotter as a drawing typewriter for about $225.00, and this was the beginning of a new era for printer-plotters. At this time, Mitsubishi of Japan is advertising their new plotter. The plotter war is about to begin!

In short, computer speed has reached a milestone where any more speed increases will not have much impact in word processing. Humans cannot react to anything faster than 1/18 seconds due to the limited baud rate of their nervous communication systems. If all discrete operations could be performed in less than 1/18 seconds, humans would not recognize any speed increase even if the speed is elevated by the factor of 100. We would describe the ultimate speed as "in a blink of my eyes" which might take longer than 1/18 seconds, in fact it could be as long as 1/5 seconds!

The above arguments at the time of writing this do not apply for CAD and some other business programs where many and complex mathematical calculations are necessary for

continued on page 193

```
LIST 1.  The different Sanyo BIOS versions.


1.    256K SANYO SCREEN BIOS:  Version 1.00 dated 2-13-84
      This is probably the most common BIOS for the Sanyo.

2.    256K VB BIOS:  Version 1.02 dated 12-15-84
      This is the first BIOS for the video board, VB550.

2.    256K VB BIOS:  Version 1.03 dated 12-15-84
      This  BIOS  is exactly the same as above  except  the  sound
      generating  routine, in which the register CX  is  preserved
      rather than destroyed.

3.    512K SANYO SCREEN BIOS: Version 2.00 dated 11-15-85
      This  is  the  first of the BIOS for the  new  video  board,
      VB512.    Reportedly  this  one has some  bugs  running  the
      GWBASIC.

4.    512K SANYO SCREEN BIOS: Version 2.02 dated 12-26-85
      This is the newer version of the 512K BIOS for the VB512.

4.    512K SANYO VB BIOS: Version 2.04 dated 1-29-86
      This  is the vesion known to run the Lotus 123, Release  1A,
      successfully.  The former version, supposedly the BIOS  with
      Version  Number  2.03 might have difficulty in  running  the
      program.

------------------------------------------------------------------

LIST 2.    "V20VB103.BAT" -- THE BATCH FILE FOR PATCHING SANYO [VB]
           BIOS, VERSION 1.03


REM        ===== PATCHING SANYO IO.SYS VER 1.03 =====
REM              A COPY OF DOS DISK MUST BE IN "A" DRIVE
REM              THE DISK MUST INCLUDE DEBUG
pause
DEBUG < V20V103.ASC


NOTE: MAKE NON DOCUMENT FILE AS SHOWN ABOVE AND PLACE IT IN A NEW
SYSTEM  DISK  UNDER THE NAME OF "V20VB103.BAT".  THE  DISK  MUST
CONTAIN THIS FILE, THE V20V103.ASC AND THE DEBUG.COM.  THEN  TYPE
V20VB103 TO START PATCHING.

LIST 3.    V20 PATCH FOR THE SANYO [VB] BIOS, VERSION 1.03
           THIS PATCH WILL NOT WORK WITH VERSION 1.02.
           (DO NOT TYPE SENTENCES START WITH ";".)


L100 0 5 1                   ;FIRST LOAD THE DIRECTORY INTO MEMORY.
E10B                         ;GO TO THE ENTRY OF THE IO.SYS.
20                           ;CHANGE THE ATTRIB TO READ AND WRITE.
                             ;"CR" TO END OPERATION.
W100  0  5 1                 ;WRITE THE MODIFIED DIRECTRY TO DISK.
N A:IO.SYS                   ;ENTER THE FILE NAME TO BE OPENED.
L                            ;GET IT INTO MEMORY.
                             ;A "CR" TO MAKE SURE LOADING IS DONE.
                             ; ===== ROUTINE 1. =====
A2043                        ;START ASSEMBLY AT LOCATION 2043H.
PUSH CX                      ;PRESERVING THE CX REGISTER.
MOV CX,0084                  ;LOAD THE TIMING COUNT.
LOOP 2047                    ;START TIMING.
POP CX                       ;RESTORE CX.
NOP                          ;JUST A FILL.
                             ;"CR" TO END ASSEMBLY.
                             ; ===== ROUTINE 2. =====
A2156                        ;START ASSEMBLY AT 2156H.
PUSH CX
MOV CX,0084
LOOP 215A
POP CX
NOP
                             ;"CR".
                             ; ===== ROUTINE 3 =====
A2312                        ;START ASSEMBLY AT 2312H.
PUSH AX                      ;PRESERVE AX...
PUSH CX                      ;AND CX.
MOV AL,08                    ;08H IS RESET CODE FOR DISK CONTROLLER.
OUT 08,AL                    ;GIVE IT TO THE CONTROLLER.
MOV CX,0042                  ;TIMING VALUE.
LOOP 231B                    ;START TIMING.
IN AL,08                     ;READ THE STATUS OF CONTROLLER.
TEST AL,01                   ;THE JOB DONE?
JNZ 231D                     ;IF NOT, REGET THE STATUS.
MOV CL,FF                    ;ANOTHER TIMING VALUE, IN CL.
LOOP 2325                    ;START TIMING.
POP CX                       ;RESTORE CX ONLY.
                             ;A "CR" TO END ROUTINE 3 OPERATION.
W                            ;WRITE BACK THE PATCHED IO.SYS.
L100 0 5 1                   ;RELOAD THE DIRECTORY AND
E10B                         ;GO TO THE IO.SYS ENTRY AND
27                           ;RESTORE THE ORIGINAL ATTRIB.
W100 0 5 1                   ;WRITE THE DIRECTORY BACK TO DISK.
Q                            ;END DEBUG AND RETURN TO DOS.


NOTE:   MAKE THIS FILE, "V20V103.ASC" AS NON-DOCUMENT IF YOU  USE
WORD PROCESSOR AS YOUR EDITOR.  (SOME WORD PROCESSOR CANNOT  MAKE
NON-DOCUMENT.  IF SO, USE WORDSTAR OR EDLIN.)


LIST  4.  THIS IS "V20SS100.BAT", THE BATCH FILE FOR SANYO SCREEN
          BIOS, VERSION 1.00.

REM        ===== CONVERTING SANYO IO.SYS VER 1.00 =====
REM              A COPY OF DOS DISK MUST BE IN "A" DRIVE
REM              THE DISK MUST INCLUDE DEBUG
pause
DEBUG < V20V100.ASC


NOTE:      PREPARE  A NEW SYSTEM DISK.  PUT  THIS  FILE  TOGETHER
WITH THE V20V100.ASC AS SHOWN IN THE LIST 5 AND THE DEBUG.COM  IN
THE NEW DISK.  TYPE V20SS100 TO START PATCHING.


 LIST  5.    THIS IS LIST OF V20V100.ASC, THE PATCH FILE  FOR  THE
 SANYO  ACREEN BIOS, VERSION 1.00.  THIS PATCH DOES NOT  WORK  FOR
 ANY OTHER BIOS VERSIONS.

 L100 0 5 1
 E10B
 20

 W100 0 5 1
 N IO.SYS
 L

 A1EE3
 PUSH CX
 MOV CX,0084
 LOOP 1EE7
 POP CX
 NOP

 A1FF6
 PUSH CX
 MOV CX,0084
 LOOP 1FFA
 POP CX
 NOP

 A21BB
 PUSH AX
 PUSH CX
 MOV AL,08
 OUT 08,AL
 MOV CX,0042
 LOOP 21C4
 IN AL,08
 TEST AL,01
 JNZ 21C6
 MOV CL,FF
 LOOP 21CE
 POP CX

 A2474
 DIV AL                      ;THESE THREE LOCATIONS REQUIRE SHORT
                             ;CODES AND LOOP INSTRUCTIONS CANNOT
 A247A                       ;BE USED.
 DIV AL

 A2480
 DIV AL

 W
 Q

 NOTE:  THIS PATCH IS SIMILAR TO THE V20VB103.ASC.   FOR  DETAILED
 COMMENTS SEE THE LIST 3.
```

TI Forum

by Ron Albright and Jonathan Zittrain

Chicago's Fourth

As I am writing this January column, I am getting ready to leave for the 4th Annual Chicago TI Fair (scheduled for November 1). I am really looking forward to attending the "granddaddy" of the TI gatherings. Myarc and the new Ge'neve computer will be there (and, who knows, you may be able to even buy one by then), Ryte Data (210 Mountain Street, Haliburton, Ontario, Canada K0M 1S0) will be there showing some new things (both from Germany's Mechatronics and stateside), and, hopefully, Miller's Graphics (1475 W. Cypress Avenue, San Dimas, California 91773) will be there with more details of their planned MS-DOS hardware for the 99/4A. I'll surely have enough to keep this column going for months.

You Asked For It!

So many people have written and asked for a "Best Of" the TI Forum book, that I have decided to go them one better. I am editing, collecting, and reproducing an anthology of the outstanding works of the TI community—from you, the users of the 99/4A. The *Orphan's Survival Handbook* will be over 200 pages of the best tips, programs, schematics, hacks, tutorials, lists of BBSs, user groups, TI software and hardware producers gleaned from both the electronic (CompuServe's) and the printed (*Computer Shopper*'s) TI Forum, User Group newsletters (where the vast majority of the experts write and contribute, unselfishly, each month), and even more. New material written just for this book by some of the brightest minds in the TI community have agreed to share some of their thoughts with the readers of this book. It is being produced by Disk Only Software (P.O. Box 4170, Rockville, Maryland 20850; (301) 369-1339) and is tentatively priced at $16.95, including postage and handling. It should be informative for folks at all levels of expertise. Write DOS for details. End of commercial.

Since this column has about a three month lead time, I will not be able to annonce the winners of the 1st Annual TI Forum Programming Contest until the March issue. But, right now, I can say the response has been terrific. Thanks for the support and the proof that the TI users are still alive and healthy. Also, remember, the deadline is not til December 31, so, depending on how early this issue comes out in December, you still have some time to work with.

Around TI Land

Quick tour around the industry: Myarc (241 Madisonville Road, Basking Ridge, NJ 07920) has announced the availability of a new EPROM for the Foundation 128K memory expansion card (Foundation went out of business months ago) that will allow the card to run the new Myarc Extended BASIC II software. You can get the EPROM for $10 with the purchase of the new XB. Speaking of EPROMS, Miller's Graphics is offering one to plug into the Corcomp disk controller card that enhances its capabilities and fixes a few bugs. Also, if you have a Gram Kracker (my 1986 "Hardware Product of the Year"), you'll want to get Danny Michael's exciting accessory disk. Danny has added new commands to Extended BASIC (saved to disk, of course, with Gram Kracker) that are simply amazing. For example, "MOVE" will move lines within a program, "COPY" will copy program lines to another location and preserve the copied lines, "DELETE" will delete specified lines within a program, and more. Editor Assembler is, likewise, enhanced. This is a remarkable piece of code. If you have a Gram Kracker, buy this. If you don't have a Gram Kracker, buy one, then buy this disk. Richard Mitchell at Bytemaster (171 Mustang Street, Sulphur, Louisiana 70663) continues to do an excellent job perpetuating the legend of the *Smart Programmer*, started by Craig Miller, Richard produces a beauty of a 16-page newsletter monthly; full of upper-level programming/technical information. At $18/year, its a bargain. I seem to have gotten the address wrong for sending for Barry Traver's terrific "magazine on disk," *Traveler's Diskazine*. It should be 835 Green Valley Drive, Philadelphia, PA 19128; $30/year—6 issues on a disk. You have heard me review and hype Fairware software offerings in this space for some months. Though I wish I could, I can't mention them at all. Well, you can find out just what IS out there by sending $1.00 to Micropendium (P.O. Box 1343, Round Rock, Texas 78680) and they will send you a complete verified list that is 10 pages long and packed with software offerings. Just another very nice service from Micropendium to the TI community.

I just got off the phone with Miller's Graphics. They are still (understandably) mute about the hardware they mentioned cryptically at the Seattle TI Fair. It will be a device that will allow MS-DOS compatibility for the TI-99/4A. It will be produced by MG in association with a "larger firm." I did manage to get a price estimate from the folks at MG: "cheaper than an IBM-clone" was all they would say. That places it in the $400-$700 range. What are my guesses? Though unconfirmed by MG, I suspect the device will be an expansion case that will not only have the 8088-based operating system for the TI as well as allow almost full hardware compatibility as well. That is right—imagine plugging a modem card or a Hercules Graphics Card into your TI! Watch for more information soon and keep in touch with MG for their early information. Thus, there appears to be a brewing "split" in the TI community. Those who want to continue to upgrade along the 9900 chip capabilities will be interested in the Ge'neve from Myarc; those wanting the fabled MS-DOS capabilities will be anxiously awaiting the MG expansion box. In any case, it is a pleasant state of affairs when there appears to be two upgrade paths for the deserving TI orphans.

As promised, Listing 1 is a lenghty bit of c99 code which is a complete "game" (and I use the term quite loosely) called "CINVADERS" (get it? C Invaders?). It is more of a learning example than something that will keep your 6-year old glued to the computer. It showed me and, hopefully, you as well, how fast code written in c99 can execute. It requires version 2.0 of the c99 from Clint Pulley (see previous issues for how and where to order) and also the sound library routines which are included on the latest disk. Though the sound is superfluous and can easily be left out if you don't have that library, they add to the game. In the issues to come, I will go through the code, subroutine by subroutine and explain how it was put together. The code is intentionally modular (as encouraged by c99 syntax), and will be easy to go through in a serial fashion. So, we'll do that in the succeeding issues. For now, type it in, look it over, and send in your questions about it.

I have some more goodies I can send to anyone who writes and asks for them. You must, however, send a self-addressed, stamped envelope if you expect a reply. If you have written in the past and did not receive a reply, you can probably now guess why. Those that send postage will always get a reply. Check out the *Orphan's Survival Handbook*. I am quite proud of it. And so should you!

We've Had It All Along!

With all the speculation and possibilities that come with the new 99/4A-compatible computers on the way, we may have overlooked a 99/4A-compatible computer that's been around for several years.

How much would you be willing to pay for a computer that performs most functions over twice as quickly as the TI-99/4A? That has a built-in RF modulator, a version of TI BASIC, and a compact, modern design?

Of course, there are a few drawbacks. This particular computer has only 2K of RAM to begin with, no sound, color, or joystick capability, and no lowercase.

Unfortunately, the computer was never really available. Its price tag, "somewhere under $100," was reasonable, but the VIC-20 and the TI-99/4A itself drove it out of the market.

The TI-99/2 was a valiant effort by Texas Instruments to bolster the TI-99 family, but it just didn't make it. Expectations were high—an article by Harry Littlejohn and Mack Jander, two 99/2 developers, appeared in the June 1983 issue of *Byte* signalling just how far the 99/2 had come.

"The TI-99/2 was developed to compete directly with such low-cost computers as the Sinclair ZX81 and the Timex/Sinclair 1000," they said. I had an opportunity to use a prototype 99/2 recently, and I was pleasantly surprised. Although there is a Mylar membrane keyboard underneath, the keys could actually be pressed and responded nicely. Benchmark tests showed that the 99/2 far surpassed the 99/4A in speed, with equal precision.

Because of the internal structure, the computing speed of the 99/2 was a function of just how much was displayed on the screen at a given time. With a full screen, the computer ran only about 10% of its original blank-screen speed.

The built-in subset of TI BASIC did not have CALL's for COLOR, SOUND, JOYST, CHAR, or SCREEN, but it did include PEEK, POKE, and MCHL, a command to execute user-written assembly language programs and subprograms.

Texas Instruments was reluctant to talk about the 99/2, but according to Alan Daniel of TI, the 99/2 was "a great computer—ahead in speed." The black and white display was its major downfall since color came out at the same price in late 1983. "We never did it, never sold it," he said. "But we came close."

"By introducing peripheral and inexpensive software simultaneously with the computer Texas Instruments believes thi system will grow with an individual, inspire confidence in the use of computers, and foster the continued growth o the computer evolution," said Littlejohn and Jander in thei article.

The 99/2 fell a bit short o those expectations, but something can be learned from it The design team finished the job in a little over eigh months, from "concept to production"—record time for introducing a new computer they said.

Not only was the compute functional and ready to roll of the assembly line, but there were few bugs. I could find no errors as I tested my prototype and the 99/2 had already been beta-tested.

The 99/2 also carried on the idea that the CC-40 uses—the hex-bus interface. The ide was to make a cheap, reliable built-in interface that would allow stand-alone peripheral to be added to the computer A printer/plotter, wafertap drive, and RS232 were alread in the works. Unfortunately

Listing on page 118
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TI Form Column

Listing 1

```
               "CINVADERS"
             Copyright 1986
             by Ron Albright

#include "DSK1.GRF1RF"
#include "DSK1.SOUNDLIB"

#asm
  REF PRINTF
#endasm

int hit=0;
int landed=0;
int time=1000;
int shots=0;

main()
{
       char *alien;
       char *gun,*bullet;
       int count,set;
       hit=0;
       landed=0;
       time=1000;
       shots=0;

   alien="38100804030F1C3F03780F060C18000
         00E040810E0F89CFEE00FF830180C";
  gun="0101030307070F0F1F1F3F3F7F7F00000
        0008080C0C0E0E0F0F0F8F8FCFC"  ;
  bullet="00000000000000000000000000000
          f0000000000000000000000000000";
        grf1();
        screen(2);
        for(set=2;set<=12;set++)
           color(set,16,2);
        setup();
        instructions();
        hchar(1,1,42,32);
        hchar(24,1,42,32);
        hchar(20,1,45,32);
        vchar(1,1,42,24);
        vchar(1,32,42,24);
        locate(22,3);
        puts("SCORE:");
        locate(23,3);
        puts("LANDED:");
        locate(22,18);
        puts("TIME:");
        locate(23,18);
        puts("SHOTS:");
        chrdef(100,alien);
        chrdef(104,gun);
        chrdef(108,bullet);
        spmag(3);
        for(count=1;count<=6;count++)
        {
        sprite(count,100,16,10*count,
        10*count);
        spmotn(count,0,10*count);
        spmct(count+1);
        }
        sprite(7,104,16,140,92);
        spmct(16);
        while(1)
           {
             innon();
             arrows();
             bounce();
             gunbounce();
             bounds();
             coinc();
             timer();
             sounda(1,1800,2,0,0,0,0,5,0);
             if(time==0)
               break;
             if(hit>=10)
               break;
             if(landed>=10)
               break;
             if(shots==20)
               break;
          }

             spdall();
             clear();
             finished();
}

timer()
{

             time--;
             locate(22,28);
             printf("%d",time);
}

arrows()
{
           int u,s,c;
           u=0;
           innon();
           c=key(u,&s);
           if(s<=0)
                return;

           if(c==83 | c==115)
                spmotn(7,0,-20);
           else if(c==68 | c==100)
                spmotn(7,0,20);
           else if(c==81 | c==113)
                shoot();
}
shoot()
{
          int rp,cp;
          innon();
          spposn(7,&rp,&cp);
          sprite(15,108,7,rp,cp);
          spmotn(15,-50,0);
          shots++;
          locate(23,25);
          printf("%d",shots);
}

coinc()
{
          int zap,flagged;
          for(zap=1;zap<=6;zap++)
           {
             innon();
             flagged=spcnc(15,zap,8);
              if(flagged>0)
              {
                 hit++;
                 sound2(1,932,2,880,0);
                 sploct(zap,10*zap,10*zap);
                 spdel(15);
                 locate(22,10);
                 printf("%d",hit);
                 return;
                }
            }
}

bounds()
{
           int r2,c2;
           spposn(15,&r2,&c2);
           if(r2<=15)
                  spdel(15);
}

innon()
{
#asm
          LIMI 2
          LIMI 0
#endasm
}
bounce()
{
          int bug,rp,cp;
          for(bug=1;bug<=6;bug++)
            {
             innon();
             spposn(bug,&rp,&cp);
              if(cp>210)
                 {
                  sploct(bug,rp+8,cp);
                  spmotn(bug,0,-10*bug);
                  delay(1);
                 }
              else if(cp<20)
                 {
                  sploct(bug,rp+8,cp);
                  spmotn(bug,0,10*bug);
                  delay(1);
                 }
              else if(rp>130)
                 {
                 innon();
                 sploct(bug,10,10);
                 landed++;
                 locate(23,11);
                 printf("%d",landed);
                 return;
                 }
            }
}


 gunbounce()
 {
           int rp,cp;
           spposn(7,&rp,&cp);
           if(cp>220)
             spmotn(7,0,-20);
           else if(cp<15)
             spmotn(7,0,20);
 }
 delay(n)
 int n;
        {
             n=500*n;
             innon();
             while(n--);
        }


setup()
{
        int x;
        hchar(1,1,42,32);
        hchar(24,1,42,32);
        hchar(20,1,45,32);
        vchar(1,1,42,24);
        vchar(1,32,42,24);
        locate(21,9);
        puts("C99 INVADERS");
        locate(22,5);
        puts("(C) 1986 RON ALBRIGHT");
        locate(23,3);
        puts("THANKS TO WARREN AND CLINT");
        sound1(30,392,0);
        sound1(6,330,0);
        sound1(36,262,0);
        sound1(36,330,0);
        sound1(36,392,0);
        sound1(50,523,0);
        x=392;
        while(x>110)
        {
             sound1(2,x,0);
             x=x-30;
        }
}


finished()
{
        int c;
        locate(10,5);
        if(hit>=10)
          puts("YOU WON!");
        else if(landed==10)
          puts("10 LANDED - YOU LOST");
        else if(time==0)
          puts("YOU RAN OUT OF TIME!");
        else if(shots==20)
          puts("YOU RAN OUT OF SHOTS!");

        locate(15,6);
        puts("PLAY AGAIN? (Y/N)");
        c=getchar();
        if(c==121 | c==89)
          main();
        clear();
        text();
}


instructions()
{
        int c;
        locate(10,8);
        puts("INSTRUCTIONS? (Y/N): ");
        c=getchar();
        if(c=='Y' | c=='y')
        {
        locate(10,2);
        puts("YOU HAVE 1000 TIME UNITS
             TO ");
        locate(11,2);
        puts("SHOOT 10 INVADERS. IF 10
              LAND");
        locate(12,2);
        puts("OR TIME EXPIRES, YOU ");
        locate(13,2);
        puts("LOSE. SHOOT 10 INVADERS,
             YOU ");
        locate(14,2);
        puts("WIN! S AND D KEYS MOVE GUN");
        locate(15,2);
        puts("USE Q KEY TO SHOOT. YOU
             HAVE");
        locate(16,2);
        puts("ONLY 20 SHOTS TO FIRE!");
        }
        locate(18,6);
        puts("PRESS ANY KEY TO START");
        getchar();
        clear();

}
```

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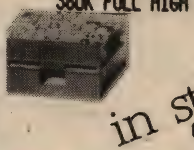

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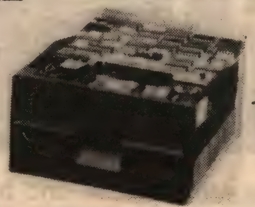

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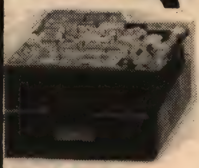

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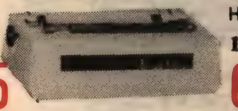

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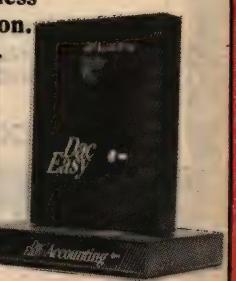

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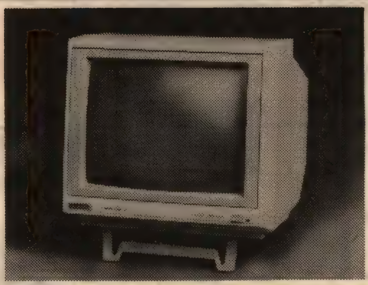

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COMPUTER BOOKS

Top 10 Computer Book List January 1987

Understanding dBASE III Plus
Alan Simpson
SYBEX
$19.95
Pages: 415
Copyright: 1986

dBASE Commands and concepts are illustrated throughout the book with practical, business oriented examples—for mailing lists, accounts receivable and inventory design—PLUS scores of expert tips and techniques. *Understanding dBASE III Plus* covers interfacing with Lotus, VisiCalc, Wordstar, and upgrading from dBase II. Other titles include: *Mastering dBASE III Plus* [$22.95] *Advanced Techniques In dBASE III Plus* [$22.95] *dBASE III Plus Programming Tips and Techniques* (Ashton-Tate) [$19.95].

Also available are the *dBASE III Plus Handbook* (2ED) [$19.95] (Que) as well as the *dBASE III Plus Applications Library* [$19.95] (Que).

Inside AutoCAD (2nd Ed)
Raker & Rice
New Riders
$34.95
Pages: 309
Copyright: 1986

Raker and Rice tell the inside story of how to use AutoCAD and they give a "hands on" feel for the program. Contents include Setting Up AutoCAD—Getting Around—Graphics Primitives—Introduction to Editing—Drawing enhancements and much more. An easy step-by-step introduction with over 300 drawings explaining the use of AutoCAD and handy references for setting up the program for professional drafting and design work.

An ensuing title, more advanced and more technical than the above is *Working Out With AutoCAD* [$29.95] (New Riders Press). See also the CAD book listing elsewhere in this issue.

Running MS-DOS (2nd ED)
Van Wolverton
Microsoft Press
$21.95
Pages: 500
Copyright: 1985

The second edition of this highly successful title is updated to cover MS-DOS through 3.1. This is truly the cornerstone book for any serious MS-DOS user's library. Quote *PC Week*"...written in that strange and wonderful tongue called English." Van Wolverton has worked at IBM and INTEL. A similar title is the *MS-DOS User Guide* by Devoney [$19.95] (Que) and *Introducing PC-DOS and MS-DOS* by Sheldon [$18.95] (McGraw-Hill)

Complete Turbo Pascal (2ED.)
Duntemann
Scott Foresman & Co.
$22.95
Pages: 528
Copyright: 1986

The second edition of this best-selling book offers a complete guide to the latest version of Turbo Pascal, Release 3.0.

Written for programmers new to Pascal, this is an excellent guide to Borland's best selling Turbo Pascal Compiler. After a complete tutorial on the Pascal language, there follow detailed instructions on installing, modifying and using Turbo Pascal on both MS-DOS and CP/M systems.

Contents include the following: Techniques for structured programming and program design, a guide to using Turbo Editor, Instructions on Turbo Pascal commands and overlays, explanations of the extended Turbo Pascal features not covered in the manual. This very readable, comprehensive guide includes dozens of examples—from the very elementary practice problems to large, complex programs. The author includes explanations of Turbo Pascal error messages as well as a detailed glossary. Other titles include: *Advanced Turbo Pascal* (Osborne McGraw-Hill) [$18.95], *Turbo Pascal: A Problem Solving Approach* (Addison-Wesley) [$25.95] and a recent arrival on the scene *Turbo Pascal Program Library* [$19.95] (Que).

IBM PC (and compatibles) Free Software Catalog And Directory
Froehlich
dilithium Press
$17.95
Pages: 923 Copyright: 1986

Two major and four smaller free software libraries are cataloged and indexed in this volume. Covering 625 disks and 12,000 disk files. A most complete, integrated and compiled directory. Cataloged by Keyword, Language, Author/Group, Title, and File Name. This title is designed for newcomer, nonprogrammer and demanding user.

A title serving a similar function for commercial software and more descriptive is the *IBM PC Expansion & Software Guide*, 6th Ed. [$29.95] (Que)

continued on page 122

The Tao of Programming

InfoBooks is proud to announce the publication of *The Tao of Programming,* translated and edited by Geoffrey James. Published for the first time both the original Chinese and English translation, *The Tao of Programming* represents an unparalleled opportunity for the computer scientist, programmer, hacker, or novice to learn the universal and mystical wisdom of the art of computer programming.

There are many books about programming, but they all deal with mere surface issues, such as algorithms, language constructs, and the like. *The Tao of Programming* goes right to the heart of the most important questions that face the programmers of today. Questions such as: What is the meaning of life? Why do I exist? How can I debug a program that locks the keyboard?

The Tao of Programming answers all these questions and more by revealing the secret techniques of program development practiced by the ancient masters in the dawn of the computer age.

What Is "Tao"?

The word "Tao" (pronouned "D-ow"), often translated as "Way" or "path," refers to the dawning of the consciousness to the cosmic forces that direct the mind of the superior programmer. When the programmer reaches true understanding of Tao, the programming becomes a form of technological meditation. The flow of universal energy permeates the entire development process, resulting in programs that participate in the profound perfection of the cosmos, thus tending to be relatively glitch free.

Where Did The Book Come From?

The origins of *The Tao of Programming* are lost in the mists of time. The manuscript, labeled with the cryptic message: "Destroy after processing," was discovered amidst a collection of obsolete punch cards. After years of backbreaking analysis and translation, the manuscript was finally deciphered and decrypted. It was then that *The Tao of Programming* emerged to take its rightful place in the history of computers.

According to legends, *The Tao of Programming* was originally opposed by both the academic and business communities, because it represented a significant threat to the established order. The manuscript was forced underground, circulating only in machine-readable form among selected programmers. During the period of persecution, (referred to by some as "The Great Lay Off" and by others as "The First Shake Out") it was thought that *The Tao of Programming* was lost forever. But thanks to InfoBooks and the translator/editor Geoffrey James, this ancient classic of esoteric programming knowledge has been revived.

The following is a list of the contents of *The Tao of Programming:*

Book 1: *The Silent Void*
Book 2: *The Ancient Masters*
Book 3: *Design*
Book 4: *Coding*
Book 5: *Maintenance*
Book 6: *Management*
Book 7: *Corporate Wisdom*
Book 8: *Hardware and Software*
Book 9: *Epilogue*

Here are some sample quotes from *The Tao of Programming:*

"You can demonstrate a program for an executive, but you can't make that executive computer literate." (Book 7: Proverb 1)

"Software rots if not used... This is a Great Mystery." (Book 5: Proverb 3)

"Do not program in Cobol if you can avoid it." (Book 3: Proverb 2)

"A manager went to his programmers and told them: 'As regards to your working hours: you are going to have to come in at nine in the morning and leave at five in the afternoon.' At this, all of them became angry and several resigned on the spot. So the manager said: 'All right, in that case you may set your own working hours, as long as you finish your projects on schedule.' The programmers, now satisfied, began to come in at noon and work until the wee hours of the morning." (Book 6: Proverb 2)

The Critics Speak

Advance copies of *The Tao of Programming* were distributed to important critics in the field of computer science. Here are some of their comments:

"Undoubtedly the most important book to appear in years." Dr. John Dee, Miskatonic University of Artificial Intelligence.

"It has changed my life....a landmark." Charles (Chuck) Babbage, Noted Computer Savant.

"Good book. Read now." Dr. C.P. Yu, Peking School of Computer Science.

"Is this a joke or what?" Malcolm R. Shimmelfennig, IBM System Programmer.

For more information contact InfoBooks, P.O. Box 1018, Santa Monica, CA 90406; (213) 470-6786.

Mention that you read about it in *Computer Shopper*. ●

**Computer Book List
continued from page 121**

Commodore 128 Programmers Reference Guide
CBM
Bantam
$21.95
Pages: 745
Copyright: 1986

This reference guide by Commodore from Bantam Books, is for anyone using the new and powerful C-128. The 128 has many existing features including CP/M, superior sound, graphics and sprite handling. The book covers many features of the machine and contents include: Basic Building Blocks, Basic 7.0, Programming the 80 column chip, CP/M on the 128, Memory Maps and C-128 hardware specifications, just to mention a few chapters in this comb bound 745 page reference book. Other titles include *COMPUTES!'s 128 Programmers' Guide* [$16.95] *(COMPUTE!)*, *Your Commodore 128* [$14.95] (McGraw-Hill) *Mastering Disk Operations On The Commodore 128* [$15.95] (Sybex), *Mapping The Commodore 128* [$14.95] (COMPUTE!)

Supercharging MS-DOS
Van Wolverton
Microsoft
$18.95
Pages: 352
Copyright: 1986.

Van Is Back!!!! Running MS-DOS sold 300,000 copies!! Now *Supercharging MS-DOS* takes readers several steps further in understanding and using MS-DOS. Users primarily in the business and university market who have a basic understanding of MS-DOS will want to explore its intermediate possibilities. In a style that has been praised by reviewers and computer users [as well as booksellers!] Wolverton shows users how to customize the behavior and appearance of an MS-DOS compatible machine.

Programming In Prolog
Clocksin & Mellish
Springer Verlag
$17.95
Pages: 279
Copyright: 1985

Newly revised and updated, this title examines Prolog as a practical programming language with examples and problems to demonstrate how to use Prolog effectively. Other titles include *Implementation Of Prolog* [$29.95] (John Wiley) and *Learning Micro Prolog* [$12.95] (Addison-Wesley). From McGraw-Hill: *Using Turbo Prolog* [$19.95]

Amiga Rom Kernel Referene Manual: Libraries and Devices
CBM, Addison-Wesley
$34.95
Pages: 544
Copyright: 1986

The Amiga ROM Kernel Reference Manual contains a complete listing and description of the Amiga's built-in read only memory (ROM) routines which support graphics, sound and animation and systems software which support graphics, sound and animation. Assumes a basic knowledge of C and Assembly Language. Other titles include: *Amiga Hardware Reference Manual* [$24.95] and *Amiga ROM Kernel Reference Manual: Exec.* [$24.95]. Also available are *Amiga Programmers Handbook* [$24.95], *Amiga Programming Guide* [$18.95] (Que). *COMPUTES!'s Amiga DOS Reference Guide* [$14.95] and *COMPUTES!'s Amiga Programmers Guide* [$16.95].

***Using 1-2-3* (Includes Release 2)**
Leblond
Que
$19.95
Pages: 540
Copyright: 1986

This new edition of the classic *Using 1-2-3* highlights changes well. 125 extra pages and a tear out chart are now included. This title must surely rank amongst the greats when it comes to Good books on 1-2-3. Other titles in this series include *1-2-3 Macro Library* (2 ED) [$19.95] and *1-2-3 Tips, Tricks and Traps* [$19.95].

Using Turbo Prolog
Robinson
McGraw-Hill
$19.95
Pages: 300
Copyright: 1986

Using Turbo Prolog allows the programmer to maximize coding skills with this new compiler from Borland. Using multiple windows to view and modify programs while they run, this title allows you to learn programming techniques using color graphics, turtle graphics and sound. Offers detailed coverage of Prolog statements, functions and operations.

80386/80286 Assembly Language Programming
Murray & Pappas
McGraw-Hill
$19.95.

This comprehensive guide enables serious progammers to take full advantage of the unique design of the 80386 and 80286 microprocessors which have recently burst onto the market. The authors carefully detail the use of assembler pseudo-ops; macros, procedure and libraries; and testing and debugging techniques. Experienced programmers have an invaluable reference to the 80386/80286 instruction set.

* * * * * * * * * * *

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Readers!!!

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This might be inviting trouble, but if you know of a title that you have found particularly useful, or just to the contrary, or, if you have comments about the column, the authors will look forward to hearing from you. We cannot guarantee individual replies to everyone who contacts us, but we'll try! Please use the InfoSource address quoted above. You are welcome to leave a message on CompuServe #73177,3274.

NEW CAD and AutoCAD titles which have come onto the bookshelves.

Following the success of *Inside AutoCAD* by Raker and Rice, published by New Riders Press at $34.95, a new, and according to the author, far more advanced and technical title, is now available. The many *Computer Shopper* readers who are using *Inside AutoCAD* as their standard manual will find this title useful.

A brief synopsis of this and other titles follows.

Working Out With AutoCAD
New Riders Press
$29.95
Pages: 280, Copyright: 1986

Working Out With AutoCAD contains Seven Exercise Sets and 23 structured Exercises. It covers advanced setup techniques for AutoCAD and includes the use of MS-DOS to organize system layout. The Exercises cover advanced drafting techniques, drawing libraries with symbol libraries and creating macros using AutoCAD V3.5 and AutoLISP.

The book contains over 50 macros integrated into the drawing exercises. These include AutoCAD command macros, drawing macros and advanced macros developed in AutoLISP, AutoCAD's LISP programming language. Macros are also available on an inexpensive floppy disk. At time of going to press, the price of the disk was not available.

Mechanical CAD Lab Manual
Voisinet
McGraw-Hill
Pages: 168
[506 Illustrations]
Copyright: 1986

The skills emphasized in this title can be applied to any CAD system. Contents include: systems and drawing definition (configuration, boot up/log-on drawing definition, menus, basic functions); developing the shape description; developing the size description; drawing commands and much more.

The CAD/CAM Primer
Bowman
Sams
$14.95
Pages: 160
Copyright: 1985.

Computers have always been good at generating reems of printed information. Now let computer graphics and especially, CAD/CAM condense this for you into a multitude of printouts that are easily understood. This title will teach the basics of computer aided design and manufacturer and its probable impact on our lives.

The preceding list includes titles that have been popular with *Computer Shopper* readers during the past month. The list is compiled by InfoSource, a mail order book seller and is not strictly the list of numerical best sellers nationwide. However, every title on the list is a best seller. If the titles listed are not available in your local bookstore, they can order them for you, or you can get them directly from InfoSource, Box 21092, Midtown Station, New York, NY 10129; (201) 595-4505

To all our readers, friends and customers, new and old, editorial and ad staff at *Computer Shopper*, Happy Holidays!!! and may there be a 68000 or 386 type marked specially for YOU!!! ●

Under The Apple

Discover The Power Of Macintosh Desk Accessories

Desk accessory programs turn the Macintosh computer into a customized, high-powered workstation.

With the large number of desk accessories available the marketplace needed a complete, informative source-book describing what desk accessories are, which ones are available, where to get them, and how they work.

InfoBooks is proud to answer that need and announces the publication of a new book: *Under the Apple—Discover the Power of Macintosh Desk Accessories.*

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Under The Apple surveys commercial desk accessories, including a special chapter on desk-accessory sets, as well as shareware and freeware programs.

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Each accessory review includes discussions of: What It Does, What You Get, How It Works, Special Features, Limitations, Product Information, Manufacturer's Information.

Under the Apple concludes with several useful Appendixes that describe the sources for shareware accessories.

These include a description of the Micronetworked Apple User's Group (MAUG) on CompuServe, with instructions for using its data libraries and downloading programs into your computer.

There is also a list of over 50 major Macintosh User's Groups across the United States and in Europe.

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Finally, there's a special offer to readers of *Under The Apple* to receive most of the freeware and shareware desk accessories mentioned in the book on a 2-disk set for a nominal fee.

Under the Apple is the essential sourcebook on Macintosh desk accessories for Macintosh users everywhere.

For further information contact Info Books, PO Box 1018, Santa Monica, CA 90406; (213) 470-6786.

Mention that you read about it in *Computer Shopper.* ●

Expanding Your Heath/Zenith PC-Compatible

by Ted Drude

After spending the last couple of columns reviewing programming software, it's time we get back to some hardware topics. This month, we've got a project especially for all you hardware hackers out there. If you've previously bought or built Doug Severson's PC-Sprint turbo board, you can now add a software speed selector to it. The circuit mods and all the details are in this month's column. There are special modifications for both the H/Z-150 and PC-XT compatibles.

Just so you software fans won't feel left out, we'll also take a look at some different versions of Zenith's ROM BIOS chips which have been used in various 150 and 158 series machines. We'll see how they compare to each other and the world of IBM compatible BIOS ROMs in general. And, to start things off, here is an update on the A86 Macro Assembler which was first reviewed here last month.

The A86 Macro Assembler (Revisited)

Those of you who read last month's review of the A86 Macro Assembler, should be aware of a couple of items that need correcting. First of all, the author's name is Eric Isaacson (not Issacson as I misspelled it). Second, the latest version of A86 does indeed have the 8087/287 numeric instructions included. Since I don't program for the 8087, I wasn't aware of them in the version I reviewed. I simply was relying on the documentation that came with the program disk. After reading the review, Eric contacted me to let me know that the numeric instructions are now a standard part of A86.

Mr. Isaacson also agreed somewhat with my criticisms about the need for more organization of the A86 disk documentation and is going to add page numbers and an index. He also commented that he hopes to eventually extend the D86 symbolic debugger far beyond the capabilities of MicroSoft's SYMDEB. Accordingly, he feels that the $40 registration fee is fully justified.

Undoubtedly, the A86/D86 package is a bargain. And, as it now stands, I would say that D86 is still a very good program. If it ends up with most of the improvements Eric says it will have, then I agree that it will be well worth the $40 registration fee. We will definitely be watching to see what happens with these two fine programming tools.

(For those who are interested in trying out A86 or D86, but can't find them on a local BBS, they are both still available on a postpaid disk for $5. Check later in this article for the ordering details.)

PC-Sprint Modification: A Software Speed Switch

As mentioned earlier, we've got a modification for Doug Severson's PC-Sprint turbo board that we featured in our September issue. It's a software selectable speed switch, which gives you the ability to select CPU speed from within programs. With a little wave of the soldering iron and the addition of an inexpensive 74LS04 IC chip (selling for about sixteen cents each, last time I checked), you can add a software-controlled speed switch to PC-Sprint that will work with all PC-XT compati-

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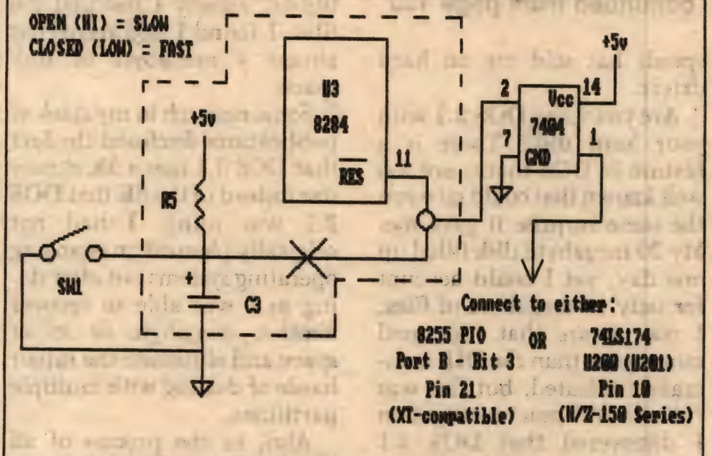

(Fig. 1 - PC-Sprint Software Switch Modification)

Table # 1

BIOS Version	Release Date (F800:0000)
1.8A	07/17/84
2.3B	06/18/85
2.5A	12/06/85

Zenith ROM BIOS Release Dates

```
        Set 8255 PIA Port B Bit 3 HI   (CPU Fast)


  MOV   DX,061H

  IN    AL,DX

  AND   AL,8

  OUT   DX


       Set 8255 PIA Port B  Bit 3 LOW  (CPU Slow)


  MOV   DX,061H

  IN    AL,DX

  OR    AL,0F7H

  OUT   DX
```

Listing # 1 - CPU Speed Switching Software

Mouse Menus for Hard Disk Use

by Jack W. Bazhaw

After purchasing my Heath/Zenith 150 PC, I started keeping an eye on the price of hard disks, hoping they would keep coming down until they reached what I felt was an affordable price. The bug to get one was really planted when my boss demonstrated the hard disk on his machine. Shortly thereafter I placed an order for a 20 megabyte unit. It took just a short period of use to convince me I would never be happy using a PC without a hard disk. As a bonus, I was able to retain my two floppy drives.

Looking at the H/Z 150 unit, it does not appear to have room for a third drive. Zenith departed from the IBM physical design for the PC. Instead of space for two full-height drives alongside each other, they reduced the footprint by going for two half-height drives, one above the other. However, with two half-height floppy drives installed there is still room under the lower drive to tuck in a half-height hard disk—invisible inside the machine.

It took me about an hour to install the drive; the hardest part was waiting for the postman to make the delivery after I placed the order. Since the drive was to be hidden inside, I put a drive indicator light on the front panel of the H/Z 150 and that added another quarter hour.

To install the hard disk, I removed the cover (and power cord), front panel and the cables from the floppy drives. Then removed the chassis holding the drives as a unit with the drives still attached. The 3½ inch hard disk slipped in right under the lower drive; it was not necessary to remove either floppy. The mounting holes are even in the right place on the chassis.

Before fastening the drive in place, I unplugged the indicator lamp in the half-height bezel attached to the drive. Included with the drive was a full height bezel which was not needed. I removed the indicator light from it including the attached cable and plug. Then I cut the cable in the middle and soldered in a 10 inch extension to each wire.

To mount the indicator lamp in the panel, I drilled a hole, then used a square file on the soft plastic to make a rectangular opening to fit the lamp holder.

Reassembly required some juggling. The little plug for the drive indicator light had to be inserted before fastening the drive into the chassis. This left the front panel dangling while fastening the drive in the chassis and putting the chassis back into the main assembly. The front panel was reattached last.

The half-card controller was inserted in a slot and the flat ribbon cables to the hard disk were connected as were the original ribbon cables to the floppy drives. Only two power connectors for the disk drives were available. I used the one that had powered B drive to run the hard disk. In order to power all three drives, I built a Y-connector using Calectro F3-270 connectors. They require some filing in order to fit. The Y-connectors are also available ready made, but I didn't realize one would be needed and did not want to again wait several days for the postman.

After putting the cover back on, the disk was ready for formatting. I started the PREP command (DOS 2.1) at 9 PM. The manual said it would take about 45 minutes per 5 megabyte of disk capacity to make 7 read/writes on each sector. When the train whistle woke me at 4 AM I took a peek and it had finished with no bad sectors found.

The next few days were spent setting up the subdirectories and putting files on the drive.

It didn't take long before the drive was half filled so the decision for the larger (and more expensive) 20 megabyte drive versus 10 meg paid off. The increased convenience (and

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A New Soft-sector Disk Controller For The H-89

by George M. Ewing

One of the pet peeves of a lot of Heath/Zenith H-89/Z89 computer users has been the high cost of the H-37 soft-sector disk controller card. It was annoying enough that the H-89 family required a separate card instead of including the driver circuitry on the main board in the first place, like the Kaypro II, Xerox/Big Board, and Ampro little boards; the high price and, lately, scarce supply of the H-37 card just added to the nuisance. When Heath first introduced the controller as a replacement for the older H-17 hard-sector card, they were asking three hundred dollars for it. Since a new H-89 system at the time cost somewhere in the neighborhood of a couple of thousand dollars, fifteen per cent or so of that amount for a card that could greatly increase your disk capacity and provide at least some compatibility with other soft-sector CP/M machines didn't seem too far out of line, though it did pinch the pocketbook a bit. More recently, with Heath no longer selling the H-19/H-89 line, and with used machines going for a few hundred dollars, the $300 price seemed much more excessive, especially as the price of other CP/M machines was also dropping fast; The Ampro CP/M Little Board I reviewed last year had a full list price for the whole computer that was fifty bucks less than Heath's last catalog price for just the H-37!

A few more adventurous Heath users got around the problem by buying surplus or replacement-part bare H-37 boards and building up their own controllers, or by buying another H-89 on the second hand market just to get a board. Another approach was, and still is, to install multiple half-height, double sided drives in the H-89, and to run them with the existing H-17 hard-sector controller. This improved on the rather paltry 100K storage capacity per drive (really only 90K useable under CP/M) of the old configuration, but still left the user with a unique disk format, incompatible with most other computers. It also meant the user had to buy hard-sector blank disks, which have become more expensive and harder to find than the more common soft-sector kind, though the mail order "disk wars" have driven overall prices down for nearly all floppy media.

Another inspired, mad scheme was to write a BIOS patch that would allow using physically soft-sectored disks with an H-17 hard-sector controller, by simply assigning a single VERY large sector to each track. I've never tried that one; hard core HUG hackers claim it's not terribly complicated for HDOS, but much more difficult under CP/M. None of these stopgap measures help the problem of software availability; many software vendors who still support the H-37 format refuse to ship software to an H-89 user who only has H-17 drives. This is particularly true for low-cost programs where the expense of several extra low-capacity disks per package may add significantly to the vendor's costs.

Now Technical Micro Systems has announced a new H-37 compatible soft-sector card for the H-89 family of machines and for their own H-1000 8086 upgrade boards. It's not a magical cure for all the needs of every user, but it's certainly a big step in the right direction. Although a completely new layout, the TMSI board is strictly compatible with the old Heath/Zenith H-37. The new design improves performance and reduces the current drain on the H-89 power supply by about half, from about 400 ma. to a little less than 200. This also greatly reduces the heat generated, both on-board and in the H-89's internal power supply. The improvement is accomplished by substituting low-power CMOS parts for many of the conventional chips in the old design, just as is done in the company's "Flicker Free" kit for the H-19, and their low-power chip kit for enhancing the stock H-89 CPU board.

Other TMSI improvements over the original Heath board design include the use of hi-rel Augat machine pin gold sockets instead of economy TI-style sockets, and gold pins on all edge and cable connectors. The manual, which is very extensive, is almost an exact clone of the original Heath H-37 manual, and almost equally idiot-proof.

The price, while not cheap, is still a step in the right direction. The retail list price of a complete soft-sector controller package, with all the necessary cables, ROM's, hardware, etc. to upgrade an H-89, is $249. For just an assembled, populated, and tested board, the list price is $195. For technically experienced Heath users (and there are a lot of them!) a bare board, plus a manual and the necessary custom PAL chips to build a working system is available for about $50.

To a user who is used to seeing IBM-PC and Apple II disk controller cards advertised at

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Mouse Menus
continued from page 123

speed) has sold me on hard drives.

Are you using DOS 2.1 with your hard disk? There is a feature in DOS that is not too well known that could give you the same surprise it gave me. My 20 megabyte disk filled up one day, yet I could account for only 15 megabyte of files. I was aware that files used more space than the DIR command indicated, but this was ridiculous! Upon investigation I discovered that DOS 2.1 changes the size of the clusters depending upon the size of the partition in use (not the disk size).

The cluster size sets the minimum space that a file can use on the disk. On a floppy, the cluster size is 1K or two 512 byte sectors. So a 25 byte autoexec batch file actually takes up 1K of space on the disk. For a partition size (not disk size) under 16 megabyte DOS 2.1 uses a cluster size of 4K or 8 sectors. However, if you exceed the 16 megabyte partition size DOS increases the cluster size to 8K (16 sectors). This means that most files, particularly small files, will require 8 more sectors of storage space just to comply with the minimum increment of file space.

At the time my disk filled there were over 1100 files on it. I felt if I could reduce the cluster size to 4K from 8K it might save one of those clusters per file which would free up over 4 megabyte of space (4K times 1100 files). The smaller the cluster size the greater the efficiency of file storage on the disk but the speed of file lookup is reduced.

Changing the partition size will ruin the data on the disk so first I had to back up the files. Then I reformatted the disk and partitioned it with 13 megabyte and 7 megabyte partitions. Finally I restored the files. I found I had recovered almost 4 megabyte of disk space.

Some research in my stack of publications disclosed the fact that DOS 3.1 uses a 2K cluster size instead of the 8K that DOS 2.1 was using. I had not originally planned on changing operating systems but after doing so I was able to recover another megabyte or so of space and eliminate the minor hassle of dealing with multiple partitions.

Also, in the process of all these gyrations, I redid the installation of Microsoft Word. Originally, for my wife and I to use Word with our own separate options/printer drivers/etc. without having to re-install each time I simply put two copies of the program on the disk. Now I keep a separate copy of the MWJNI file for each of us and copy it over as needed. With all these improvements I went from a full disk to having 6 megabyte of space left.

Two things were obvious soon after I started using the hard disk: a) I liked not having to mess with floppies; and b) There was a lot more typing needed to run programs.

My first attempt to reduce the typing involved setting up batch files. This worked but required the remembering of more file names. My wife felt some of the batch file names were rather cryptic.

The hard disk vendor had included a program (1DIR) that claimed to allow menu selection of programs, including the creation of custom menus. After reading over the manual it became obvious that this program required learning another set of commands to manipulate the menu. The program also included the

continued on page 252

Appendix

```
                    TABLE 1 - Mouse Menu Definition File

                           For "auto_mnu.mnu"

    BEGIN     run,run   ;either button runs the menu
    auto1:    MENU "SELECT PROGRAM",5,30
         OPTION     "CANCEL"
         OPTION     "Archive Files to Disk",P9
         OPTION     "Microsoft Word - Vicki",P1
         OPTION     "Microsoft Word - Jack",P7
         OPTION     "Reflex",P2
         OPTION     "Reflex Reports",P8
         OPTION     "Multiplan",P3
         OPTION     "PCTools",P10
         OPTION     "Printmaster",P4
         OPTION     "PCPaintbrush",P5
         OPTION     "END SESSION",P6
         OPTION     "CANCEL"
         MEND
    run: EXECUTE auto1 ; this label starts the menu
    P1:  TYPE       "wp" ENTER       ;start word processor
    P2:  TYPE       "db" ENTER       ;start reflex
    P3:  TYPE       "mp" ENTER       ;start multiplan
    P4:  TYPE       "pm" ENTER       ;start printmaster
    P5:  TYPE       "pb" ENTER       ;start pcpaintbrush
    P6:  TYPE       "ship"-ENTER "y"     ;park disk heads
    P7:  TYPE       "wp2" ENTER      ;start word processor
    P8:  TYPE       "db2" ENTER      ;start reflex report
    P9:  TYPE       "archive" ENTER      ;copy data files
    P10: TYPE       "t" ENTER        ;start pctools

                      TABLE 2 - "WP.BAT" File

    cd\light
    envi d
    cd \word\vicki
    word letter.doc
    cd\
    help
                     TABLE 3 - "HELP.BAT" File

    echo off
    cls
    cd\
    menu \mouse1\auto_mnu
    echo
    echo CLICK A MOUSE BUTTON
    echo
```

```
                        Table 5 - "L.BAT"
c:
cd\light
envi d
cd \word\vicki
copy \word\vicki.ini \word\mw.ini
word letter.doc
copy \word\mw.ini \word\vicki.ini
c:
cd\
cls
ship
help


                        Table 6 - "T.BAT"

c:
cd\pctools
pctools/%1/%2
cd\
help


                        Table 7 - "GS.BAT"
c:
echo off
cls
echo
echo      Press any key after the BEEP
echo
echo      to end this game
echo
cd\basic
basica surprise
cd\
help


                  Table 8 - "AUTOEXEC.BAT" File

echo off
cls
path=c:\;C:\BIN;c:\word;c:\light;c:\mouse1;c:\fw;c:\chart;c:\sk
prompt Current Directory $p $_ COMMAND $g
mode LPT1:
SUPERSPL LPT1:
echo
menu \mouse1\new_menu
rdclock
echo
echo Click a MOUSE button
echo
echo
```

TIMEX/SINCLAIR

Sinclair Survival Column

by Mark L. Fendrick

In the past year we have mentioned SuperBASIC which is the language which comes built-in on the Sinclair QL. Starting this month we will start looking at this programming language and how it is an improvement over BASIC as we have come to know it.

Upon powerup of the QL, you have three active windows. Window #0 is the default input window, window #1 is the default program listing area, while window #2 is the data output screen. Depending on whether you choose Fl (monitor) or F2 (television) you will either see two or three of those windows. In television mode, windows #1 and #2 are superimposed upon each other, while in monitor mode they are side by side. In each case, window #0 is at the bottom of your screen. These defaults may be left as they are altered and redefined in a number of ways.

The QL has the ability to define and use up to a total of 255 windows. Each of these windows act independently of each other and can either be part of a single program, or used by a number of different programs thanks to the QL's ability to multi-task.

Three keywords can be used to define a new window. The simplest is, logically enough, Window. It is used in conjunction with four parameters; window width, window depth, and the pixel coordinates of the top left hand corner. You will also have to link the window to a channel which will be used in the event that you are defining or using more than one window. (If you are only using a single window this is not necessary.) The format is:

```
WINDOW x-width, y-width,
x-coord, y-coord
```

Once defined, each window may be further defined as to Border, Paper and Ink. In addition, Strip, Pan, Scroll and Cursor may be used within any selected window.

In order to properly place your window, you will need to be familiar with the pixel system on the QL. (Don't confuse this with the graphics coordinate system which starts in the bottom left hand corner and can be scaled—but more on this at a future point in time.) The upper left hand corner in the pixel system is designated 0,0. For purposes of defining windows, the screen goes from 0 to 512 from left to right (the x axis) and from 0 to 256 (the y axis) from top to bottom. Attention does not have to be strictly paid to whether you are in medium or high resolution mode.

Therefore, to define a window which will take up the entire screen, try this:

```
100 WINDOW 512,256,0,0
110 PAPER 4
120 CLS
```

As you see when you RUN this, whether you were in medium or high resolution mode, you now have a screen which is a solid color covering the entire useable area of your display. Try typing in CLS; CLS #0; CLS #1 and CLS #2. What happened? Can you explain it? What you are seeing is the fact that although you have defined a large window, you have not lost other default windows, and when you CLS that screen they reassert their existance.

Windows defined in this manner may be used to output data from a program, or to INPUT required data. Using the INPUT command and adding the necessary channel designation to that command, you are able to request and enter data in the usual manner. If there are a number of channels open with the ability to INPUT data, a flashing cursor will be present at the position where it will accept the INPUT. To alternate between available channels press CTRL-C. The flashing cursor will move from window to window as it selects the channel from which it expects data INPUT.

As with the previous WINDOW command, you will need a few parameters to OPEN a Console. To open such a device to channel 7 the format would be as follows:

```
OPEN #7, con _ width x depth
a xcoord x ycoord
```

This can be read as "OPEN to channel 7 a console device of width by depth at the point defined by xcoord and ycoord." Note the "x" between the width and depth specifications as well as the coordinate locations. The "a" between the two sets of parameters must also be included.

Another parameter can be added at the end of this configuration which specifies the size of the print ahead keyboard buffer.

There is another command which is used in the same manner as con _ except that it cannot be used as INPUT. By replacing con _ with scr _ you can open such a window.

Another feature of SuperBASIC is its ability to write Procedures which can be called by name either from within a program or in the immediate mode. Using these procedures can, in almost all cases, eliminate the need for subroutines. A procedure is defined by name, followed by the routine and finally an end-marker. The following procedure is a simple one which only asks for some INPUT. I have named this procedure "ask," but you can give it any designation you wish.

```
1000 DEFine PROCedure ask
1010 CSIZE 2,0
1020 INPUT "Enter any
number you like: ";num
1030 END DEFine ask
```

(A note here about SuperBASIC keyword abbreviations is in order. The one stroke keywords which we have come to know on Sinclair computers do not exist on the QL, but you have the ability to enter—letter by letter—shortened forms of certain keywords. You can identify these keywords by the fact that portions of the command is in capitals while the remaining portions are in lower case letters—regardless of whether you typed them in upper or lower case. You have the option of only entering the shortened version or the entire keyword. It will appear in its entirety in the program listing in either case.)

Now add this short procedure for printing your number. We will call this procedure "show."

```
2000 DEFine PROCedure
show
2010 CSIZE 3,1
2020 PRINT num
2030 END DEFine show
```

If you RUN this program as it stands, you will find that absolutely nothing at all happens! In order to use these procedures, we will add a short program.

```
100 REPeat demo
110 ask
120 IF num = 999
130      PRINT "BYE-BYE"
140      STOP
150 ELSE
160      show
170 END IF
180 END REPeat demo
```

We have set this up so that it will continue to run until you enter the number 999 when requested. (Can you now rewrite this program to take advantage of more than one window? Try it and send your best effort to me in care of *Computer Shopper* and I will share the best demonstration of these techniques.)

Notice, as well, that we have used a number of other SuperBASIC features in this small program. First we will look at the command CSIZE which appears in lines 2010 and 1010.

CSIZE (which stands for character size) allows the programmer to define the size (height and width) of the characters shown on the screen. It requires a designation for both parameters and may include an optional channel number if you are defining the size in a window other than window #1. The format for this is:

```
CSIZE [optional channel,]
width, height
```

The width may be specified by a number in the range 0-3. Width defines the horizontal size of the character space. A 0 = 6 pixels; 1 = 8 pixels; 2 = 12 pixels and 3 = 16 pixels. Height defines the vertical size of the character space – 0 = 10 pixels and 1 = 20 pixels. Once the character space is defined by this command, the character will automatically adjust to fill the space available.

The default character size in high resolution mode is 0,0 and the corresponding default for medium resolution mode is 2,0. Using this command you can adjust the size of the character to match a particular window size or just to attract attention. It is also used for title screens or page headings.

You will also notice the REPeat loop used in lines 100-180. In previous versions of Sinclair BASIC, you could form a loop in two ways—using a GOTO statement or an IF. . .THEN routine. SuperBASIC adds an additional type of looping procedure. . .the REPeat loop. This is used by defining both the start and end of the loop in a manner similar to that used in defining a procedure. One thing to keep in mind when using this command (or any loop for that matter) is to create a way out for yourself. In this case our "escape valve" is shown in lines 120-140. We have arbitrarily selected the value of 999 to terminate the execution of this program. The use of the IF. . .ELSE construction is shown here.

The REPeat loop starts off by calling the "ask" procedure we have created in which the user is asked to INPUT a value. Once the procedure is completed, the program continues at the statement after which "ask" was called. In this case it is the beginning of the IF. . .ELSE routine. The variable "num" is checked to see if the value is 999. IF it is indeed 999, the words "BYE-BYE" are printed and the program execution is halted. If the value is anything other than 999 the ELSE part of this construction comes into play and the value is printed to the screen by calling the procedure which we have called "show." Once that is done and the END REPeat statement is encountered the program loops back to the beginning as defined by the REPeat statement. Although not immediately noticeable, the QL does contain a realtime clock which is running all the time the QL is powered. Due to the fact that there is no constant power source to the clock chip, the time and date must be set each time you turn the QL on if you are going to use this information.

The SuperBASIC command to set the clock is SDATE. The format is:

```
SDATE year, month, day,
hours, minutes, seconds
```

Accordingly, the way you would set 2:35 P.M. on December 10, 1986 would be:

```
SDATE 1986,12,10,14,35,0
```

Notice that 2:00 P.M. is entered as 14 using the 24 hour clock. Once this is set, the QL will automatically know what day of the week is correct and you will not have to set it although you may request that information along with the rest of what you have just entered.

To retrive this information from SuperBASIC you would use the function DATE$. This will return a string in the form:

```
YEAR MONTH DATE HOUR
MINUTE(S) SECOND(S)
```

As with any other string you

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MISCELLANEOUS

UNIX Operating System Case Study

by Ken McMillen

History Of The UNIX Operating System

The UNIX operating system began in the late 1960s as a project, at the Massachusetts Institute of Technology along with Bell Laboratories and General Electric, to improve the state of the art in timesharing software. An operating system called Multics was developed and ran on General Electric's GE 645 mainframe. The system was considered as an advanced, interactive operating system. Even though the system was powerful, it was too expensive to use, too big, and too slow. Because of this Bell Labs decided to get out of the project.

Ken Thompson, a computer scientist at Bell Labs, was now without the hardware he used to run his video game called Space Travel. He then gained access to a Digital Equipment Corporation PDP-7 so that he could run his simulation of the solar system program. While enhancing his program, he began experimenting with a new type of file system which would make his software development easier. Before long Thompson had developed a very basic operating system that included some utility programs and a kernel. Since his previous project was called Multics, meaning a multiuser system, Thompson decided on the name UNIX for his operating system, meaning a single-user system or uni.

UNIX began gaining the attention of others at Bell Labs. Dennis Ritchie, a system software designer at Bell Labs, worked with Thompson to further the development of UNIX. In order to improve other operating systems, Thompson later developed a language called "B." Ritchie then reworked B and came up with a new and improved language called "C." Then in 1973, UNIX was rewritten from B to C. C was designed in such a way that it did not require the architecture of one specific machine and was efficient enough not to require assembly language for speed. This allowed programs written in C to be transported from one machine to another very easily. Since UNIX was written in C, it had the needed speed along with portability. The bottom line is that such an operating system and the language C would benefit everyone by requiring only one user manual, one customer support group, and one set of source code and documentation. Software could be developed and used more widely at lower prices.

Features of Standard Unit Systems

The UNIX system exists in a number of different versions. The reason being that UNIX is the property of AT&T. For a vendor to enhance or modify the UNIX system requires the source code which is licensed by AT&T. Also AT&T supports a limited number of computers that run the system. Therefore, for a vendor to pay the license fees and then transport it to another machine proves to be quite expensive. It is easier for a vendor to just write a look-alike from scratch and market it as their own. UNIX then begins to lose its original meaning, to provide a uniform operating system for wide use.

A UNIX system's main features are the kernel, the shell, utility programs, and user programs. The kernel provides the interface between the user and various types of computer architectures. The shell interacts directly with the user in accepting the executing commands. The utility programs are various routines which perform system functions, file management, text processing, office support, software development, communications, and graphics. User programs can be a combination of utility programs or a specific application.

Process Control

A standard UNIX system contains a kernel which controls the system hardware and performs low level functions. The UNIX system is dependent on the kernel to perform services for each operation. The kernel insulates the functions of the system from the different computer architectures. The kernel works with the file system, system security, input/output services, process scheduling and management, memory management, interrupt and error handling, date and time services, and system accounting if used. The kernel must ensure each application or request receives proper processing and memory allocation.

Process Creation

A process is a program in a state of execution. There may be many processes executing at one time with each process sharing processing time. Each process is given an identity so that each process can be identified. A process might have the capability of creating and executing another process. This is referred to as process creation. For example, a process may request the use of the printer or disk drive. The process, or parent, then starts a printer process, a spooling routine or the child, and sends data to it to be printed. The spooling process, or child, is the created process. The child may run as a background process along with the parent process.

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Modula-2

by Gary N. McKinney

Modula-2 ? What is Modula-2 ?? Why even have another programming language that looks a lot like Pascal? These are the questions that people ask me when I mention Modula-2 as a programming language. I decided to write this article to try and spark some interest in users to examine this versatile language a little closer.

This article is not meant to try and teach you the language (although I do touch almost every facet of the language) as there are many good books that describe Modula-2. One such book is written by Edward J. Joyce titled *MODULA-2, A Seafarer's Guide and Shipyard Manual*. Don't let the name throw you, this book is one of the best I have seen on the Modula-2 language. Most of the discussion included in this article have been influenced by this book.

Modula-2 is one of the newer languages that come about in the pursuit of "better" programming methodology. Modula-2 performs this feat by allowing modular construction of programs. This modular construction allows you to place modules that have been debugged into a library. Allowing the use of debugged modules in other programs is one of the basic strengths of the language.

Modula-2, A Description

Modula-2 is one of those languages that you like very much or hate with a passion. Modula-2 allows you to write operating systems software much like you can with the C language.

Some functions that are part of the C language must be implemented in modules in Modula-2. Boolean math, Bit shift & rotate, and the XOR functions are not part of the Modula-2 compiler. Once the modules are written to execute the missing functions, they can be placed in a library for use by any program that require the functions.

Modula-2 does share a trait with the C language that Pascal does not. Modula-2 allows you to break the program into logical segments, then group segments into modules. Each module can be written, compiled, and debugged before the whole program is completed.

Some Pascal programmers out there are probably saying that Pascal allows you to do the same thing. If you check the ISO standard you will find that this is not the case. UCSD and TURBO Pascal have extensions that allow basically the same thing, at the expense of not meeting the ISO standards. The only thing that is specified in the Pascal ISO standard is the ability to INCLUDE program source code files during the compilation process.

Modula-2 is not much more difficult to learn than BASIC. There are only 40 keywords in the whole language. One big difference between Modula-2 and BASIC is that you have to declare a variable and it's type before you use it. Most BASIC language implementations assume that the a variable is a single precision number unless you specifically declare it otherwise.

This implied typing of a variable can lead the novice into the pitfall of trying to use a single precision variable as an integer or double precision value. Most of the BASIC dialects will do the conversions from one type to the other but the results returned from the program may not be what the programmer had intended.

Most BASICs don't allow a variable to be "local" in nature. An example of this would be in building a large program. After, say, 500 lines of code you inadvertently use a variable for a loop counter in some subroutine that was being used for another purpose in the main program body. Since most BASICs don't flag this occurrence, strange things are going to occur when the program is executed.

Modula-2 allows you to define a variable as local to a procedure. The same variable name can be defined as a global variable containing something completely different in the module that contains that procedure. The global variable is local only to the module where it is defined, unless you "export" it in the definition part of the module. Exporting variables and procedures will be touched upon a little later in the descriptions of the language.

Enough about the similarities and differences between Modula-2 and other languages. Time to give you a short overview (did I really say "short?") of the Modula-2 language itself. The following is a basic description of the Modula-2 language.

Symbols of Modula-2

IDENTIFIERS are composed of letters and digits. The first character of a symbol must be a character or the compiler

continued on page 128

Modula-2

continued from page 127

will flag it as an error. Modula-2 imposes no limit on the length of identifiers but for the sake of not tying up too much memory most implementations limit the length to the first 32 characters. One restriction that Modula-2 has on identifiers that C does not. The underscore "__" character is NOT allowed as a valid identifier character in Modula-2.

This means that a C identifier such as "Open__random__file" must be written in Modula-2 as "OpenRandomFile." Most programmers, to compensate for the lack of a word separator, will capitalize the first letter of each word in the identifier in order to make it easier to read. "OpenRandomFile" is not as easy on the eyes to read as "Open__random__file" but "openrandomfile" is harder still!

NUMERIC values are written as either whole numbers or real numbers. Whole numbers (remember? the ones with no fractional values) are interpreted as Decimal (base 10), Octal (base 8), Hexadecimal (base 16), or character equivalent, depending on the suffix. NO suffix indicates a decimal value. "B" indicates the value is octal. "H" indicates the value is hexadecimal. "C" indicates the character that is identified in ASCII code by the octal ordinal number.

REAL numbers always contain a decimal point. They may also be expressed exponentially. The exponential notation takes the form:

+ /-x.xxxxxxxEspp

where + /- x.xxxxxxx is a decimal number between + /--1.0000000 and + /-9.9999999, "S" is the sign of the, of the power, (absent for positive, minus for negative), and "pp" is the exponent or the Power of 10. If the real number is just a fractional part of 1 then a zero must be entered to the left of the decimal point.

STRINGS are sequences of characters enclosed in single or double quotation marks. A string must not extend beyond the end of a line. Character strings with the length of one are considered by Modula-2 to be of the type CHAR. Strings of greater length are regarded by the language to be ARRAYS of CHAR.

The Delimiters of Modula-2

Modula-2 has 15 delimiters of which eight have multiple meanings depending on the context in which they are used. Table 1 (pg. 258) is a list of the delimiters and their meaning.

The Operators of Modula-2

Operators allow a language to manipulate the data or make decisions based on some test of the data. Again, as with the delimiters, some of the operators have several meanings depending on the context in which they are used. The operators are listed in Table 2 (pg. 258).

As you can see from the list of operators Modula-2 has a fair number of arithmetic (for whole & real numbers) and Boolean tests that can be performed. The only thing that seems to be missing from the operators are the Boolean math, bit-shift and rotate, and the XOR functions.

There are a few rules that one must remember about the operators. Parentheses should be used to clearly indicate the precedence of operators where multiple operators appear in the same expression. In expressions without parentheses, operator precedence is relative to four classes of operators:

First (highest)	NOT ~
Second	* / DIV MOD AND &
Third	+ – OR
Fourth (lowest)	= # <> < <= > => IN

If sequences of operators of the same precedence class occur, the evaluation is made from left to right. Knowing the order of precedence allows the programmer to set up conditional tests such that if the first condition is not met in a multi-conditional expression, the rest of the test is bypassed ("short-circuited").

Constant Declarations

The Modula-2 Reserved word CONST denotes a constant declaration. Constants are used for data that is static (does not change) and may consist of numbers, expressions, characters, or strings. The use of constants really hits home when you find that some value you might have used throughout your program has to be changed. If you did not define it as a constant then you have to search through all of the source code module(s) and change the value. When a value is defined as a constant then all that is required is to change the constant value in the declaration and the compiler does the rest.

TYPE Declarations

The Modula-2 Reserved word TYPE denotes a TYPE declaration. This declaration is used to tell the compiler what storage "type" the declared variable is. There are unstructured types (which are atomic, or contain no component types) and structured types (which are comprised of elements of unstructured types). Standard types represent predesignated values.

If you have not had any exposure to Pascal or C then the above paragraph is probably about as clear as mud. The following is a brief description of the different type declarations and should help clear the water for you.

Unstructured, Standard Types

INTEGER : Positive and Negative whole number.

LONGINT : Positive and Negative whole number of greater range than INTEGER.

CARDINAL: Non-Negative whole number.

LONGCARD: Non-Negative whole number of greater range than CARDINAL.

REAL : Number with fractional parts.

LONGREAL: Number with fractional parts of greater range than REAL.

BOOLEAN : Truth values indicated by the standard identifiers TRUE or FALSE.

CHAR : One of the 128 ASCII code characters.

The nonstandard types are programmer defined. The Modula-2 unstructured nonstandard types are:

ENUMERATION: List of identifiers associated with a variable. Each identifier corresponds to an underlying CARDINAL value.

EXAMPLE:

```
WeekDays = [Mon, Tues, Wed, Thur, Fri];
```

SUBRANGE : Segment of unstructured, standard types. REAL & LONGREAL subranges are not allowed.

Subrange is used to specify a legal subrange within the total range of a specified type.

EXAMPLE:

{-1,0,1,2,3} are a subrange of INTEGER

Structured Types

Structured types are composed, or structured, of elements of the unstructured types. The following are the Modula-2 structured data types:

ARRAY : Fixed size group of elements of the same component type accessed through an index. The index must be a subrange or enumeration of the total fixed size of the array.

RECORD : Group of elements of different component types and possibly varying sizes (RECORD variant).

SET : Group of values of a subrange or enumeration. Most Modula-2 implementations limit the SET size to the size of WORD on the host computer.

There are two other TYPE declarations which form their own categories, fitting into neither unstructured of structured types.

POINTER: Used to form linked dynamic list structures. Pointer variables connect the elements, or nodes, of the list. Only the operations of assignment, dereferencing and the relational operators equal (=) and not equal (#) apply to POINTER types.

Practically speaking, pointers reference only variables of RECORD types because the pointer to the next element can be included in the RECORD data structure.

PROCEDURE: This Modula-2 keyword has two meanings depending on the context in which it is used. As a type specifier it allows procedures to be handled as variables. The procedure variables can be passed as parameters to other procedures or accessed through multiple identifiers (aliases).

Procedure typing a variable allows you to assign alternate procedures to a variable name depending on the outcome of some test. This mechanism allows you to write generalized functions to handle different types of data within the same function. This mechanism also allows one to assign the function to a "hard" memory address for the purposes of interfacing directly with the interrupt & I/O structures of the "host" computer.

Variable Declarations

So far all of the descriptions have dealt with the declarations of the types of dynamic data (data that changes) that Modula-2 allows. Now that we know the types of data Modula-2 allows we need to know how to specify the identifier name for the given data type. The keyword VAR is used to accomplish this.

EXAMPLE:

```
VAR
    i,j,k : INTEGER;
```

The VAR indicates to the compiler that the following text is assigning the data type to the identifier(s). Multiple variable identifiers of the same type may be declared by listing them, separated by commas, as seen in the example above. In Modula-2, as well as Pascal, all variables MUST be declared before they are used.

Statements In Modula-2

Statements are where the actual work is performed in Modula-2. All statements are separated from each other by semicolons. The following is a description of the different statements used in Modula-2.

Assignment Statement

The assignment operator, := , means "takes on" or "becomes." The variable label on the left side of the assignment takes on the value specified on the right side. The operands MUST be assignment-compatible. To be assignment compatible the type of the operands must be the same or the sub-ranges must be of the same type.

This assignment compatibility may seem to "tie" one's hands on those rare occasions when you might want to put one type of data in a different variable type. Included in the low-level facilities of the language there exists a legal method to assign one operand value type to a different operand value type.

Conditional Statements

All languages, in order to make decisions based on the results of some condition tested, require conditional statements in order to alter program flow. Modula-2 is no exception to this rule. The language has the IF, THEN, ELSE conditional statement. The IF statement takes the form:

```
IF      condition-1 THEN statement-1
ELSIF   condition-2 THEN statement-2
ELSIF   condition-3 THEN statement-3

.....

ELSIF   condition-n-1 THEN
        statement-n-1
ELSE    statement
END;
```

where condition-1 thru condition-n-1 are Boolean expressions that are evaluated sequentially. When the first true condition is reached, the corresponding statement is executed and the remainder of the IF statement, if any, is ignored. If none of the conditions are met then the ELSE clause is executed.

The statements following the THEN or ELSE clauses may be other IF statements allowing the "nesting" of IF statements. If only one condition is being tested with a single course of action, the optional ELSIF and/or ELSE clauses may be omitted.

The IF statement selects alternative courses of action based on the evaluation of a list of conditions. Modula-2 has an alternative way of selecting alternatives through the use of the CASE statement. The

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80386 Computer

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ted lower cost in support chips. The IBM PC was a great success and the MSDOS operating system became the most important DOS in the world. PCDOS/MSDOS had restrictions in speed and memory capacity but versions were updated to accommodate new versions of the PC family.

The IBM XT added hard disks to the computer design, but the 8088 was still used with its restrictions on memory and speed. Independent vendors came out with Turbo boards designed to speed up the PC/XT. Some of them used advanced processors such as 80186 or 80286 as co-processors designed to run the computer much faster.

Then the IBM AT came out with a true 16-bit bus much greater memory capacity and processing speed. It incorporated the new 80286 CPU which incorporated the original 8086 instruction set and much faster processing speed. It also included provisions for capabilities that previous models did not have—the 80286 was supposed to be capable of multi-tasking (which permits several computer tasks to run at the same time), and multi-user operation. The problem with the AT using these capabilities was that they were not supported by the MSDOS operating system. Everyone was waiting for new versions of DOS to use these advanced modes of operation. Meanwhile, rumors started to fly that the 80286 was really not the CPU to do all these wondrous operations. Intel was coming out with the 80386 and that was the CPU for the next ten years.

Some independent vendors came out with software to attempt to use the potential of the 80286, but 98% of AT users only used the greater speed and extra memory capacity of the 80286 and were satisfied until Microsoft upgraded DOS.

A few months ago, Compaq came out with a 80386 DeskPro computer that was only a super fast AT clone and everyone wondered how this advanced computer would survive in a market previously dominated by IBM. What was Big Blue going to do? Suppose they came out with their own 80386 computer using an advanced DOS made proprietary through the use of special large scale integrated chips and ROMS. The real fear was that IBM's special DOS could run everything that had gone before plus protected mode multi-tasking and multi-user software that no one else could use. This fear has not gone away but it has not come to pass—as yet.

The 80386 Super CPU

If you think of the CPU chip in your microcomputer as being that 40-pin, or even a 60-pin chip, think again. The 80386 comes in a 132-pin ceramic PGA (Pin Grid Array) package. This is a compact arrangement that provides high reliability. Think of a spreadsheet with the letters A through P for the columns on top and rows 12 through 14 down the side. In the center is a metal lid over the internal chip and there are no pins in the chip area columns D --L, rows 4 --11. The metal dissipated the internal heat. The chip is made by a process called CHMOS (a combination of HMOS and CMOS). However, it is not the package but the performance that makes this a super chip.

The 80386 is a true 32-bit processor with the capability of performing 3 to 4 million instructions per second and addressing 4 gigabytes of physical memory and supports virtual memory up to 64 terabytes (2 to the 46th power!). I realize that these teras and gigas mean as little to you as they do to me so let it be enough to say that this microprocessor is as powerful as the mainframes of only ten years ago. (I am talking 360/370s here!)

The 80386 provides object

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We guarantee it works beautifully the first time your plug it in and thereafter. No guesswork, no fuss. We also customize printer packages to suit your needs. Please give your computer model in the order.

Computer	Interface	CITIZEN 120D	Panasonic KX-P1080i (New)	star NX-10
Apple II+, IIe, IIc Atari 400, 800 Commodore 64, 128 IBM PCjr. Timex 2068 TI99/4A	Apricorn graphic Xetec Graphix Xetec 8K SGX S-P converter Aerco CP Axiom TI	$265	$299	$319
Amiga, Atari 520/1040, AT&T Compaq, IBM PC, Columbia, Kaypro, Osborne, Tandy, Sanyo	Cable	$215	$249	$269
Print speed (cps): draft, NLQ		120,25	120, 24	120,30
Printer buffer, warranty (month)		4K,12	1K, 24	5K,12

Color Printers

Okimate 20 Color Pak $195
- Draft/LQ: 80/40 CPS
- Print buffer: 8K
- 24 print head thermal transfer
- Complete with Plug 'n' Print interface module, cable, software, paper, and two ribbons.

For Amiga, Apple IIc/IIe, Atari ST, IBM PC, PCjr and Commodore 64/128 (New)
Optional graphics interface card for IIe. $69

JUKI 5510C $469
- Draft/NLQ: 180/30 CPS
- Print Buffer: 3K
- Use 4 colors ribbon to produce up to 7 colors and numerous shades
- Friction and push feed tractor
- JX–80 and IBM compatible
- With optional color kit installed and color ribbon

SupraDrive $685
For **Atari ST** 20 MB Hard Disk
- Improves the ST's overall performance
- Atari™ compatible with software and other DMA Buss Devices
- Includes Hard Disk Utilities

ATARI 80 Column Upgrade
Review: Computer Shopper Page 77, September, 1986

- **OmniView ROM $55** For 600XL/800XL/130XE, with Fastchip, 800 compatible OS & OmniScript word processor
- **OmniMon Board $65** For 400/800, peggyback board & OmniScript word processor
- **12" HI-RES MONITOR** 80 column **$89** Green or Amber with cable

Printer Sales

Seikosha SP1000 Pak
- Draft/NLQ: 100/20 CPS
- Print buffer: 1.5K
- Tractor and friction feed

For Commodore 64/128 with cable $179
With optional printer cable ($22 value) $209
For Apple IIc, Amiga, Atari ST, IBM PC and compatible
With printer interface and cable $259
For Apple II+/IIe, Atari 4/ 800
Specify your computer model.

Epson HomeWriter Pak $279
- Draft/NLQ: 100/16 CPS
- Print buffer: 1K
- With optional tractor and interface cartridge with cable for Apple IIc or IBM PCjr.

- **Epson FX-286 $559** Draft/NLQ: 200/40 CPS Print Buffer: 8K
- **Epson LX-86** (New) **$265** Draft/NLQ: 120/20 CPS IBM compatible
- **Citizen MSP-10/15 $309 / $419** Draft/NLQ: 160/40 CPS. 1K buffer.
- **Citizen MSP-20/25 $359 / $519** Draft/NLQ: 200/50 CPS. 8K buffer.
- **Citizen Priemiere 35 $509** Daisywheel. 35 CPS. 8K buffer. 15" carriage. Friction and push tractor feed standard. Emulate Diablo, Qume, NEC printers.
- **Toshiba P321** 216/72CPS **$489** 24-printhead. Free IBM ROM set ($49 value).
- **Star LV-1210** 120/30CPS **$185** Same as SG-10. With improved features.
- **Star NX-10 C** 120/30CPS **$259** For Commodore 64/128. With cable and new ROM to improve print features.

Panasonic

2-year warranty on all printers

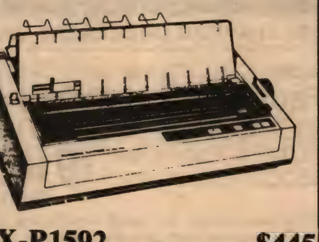
Introducing
Two New Improved Models:
KX–P1080i : 120/24 CPS
KX–P1091i : 160/32 CPS
IBM graphics and Epson compatible

KX-P1091i $285
- Draft/NLQ: 160/32 CPS
- NLQ in Italic, Bold, Double width, Elite
- Print Buffer: 1K
- Friction and push tractor feed
- IBM Graphics and Epson compatible

Suggested retail: $499

KX-P1092 $325
- Draft/NLQ: 180/33 CPS
- NLQ in Italic, Bold, Double width, Elite
- Print Buffer: 7K
- Friction and push tractor feed
- IBM Graphics and Epson compatible
- 5 Switch selectable print modes

Suggested retail: $599

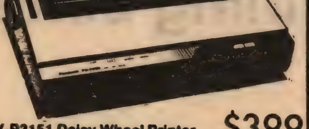


KX-P1592 $445
- Draft/NLQ: 180/38 CPS
- 9 Switch selectable print modes
- Print Buffer: 7K
- Friction and push tractor feed
- IBM graphics and Epson compatible
- 15" carriage

Suggested retail: $699

KX-P1595 $609
- Draft/NLQ: 240/51 CPS
- Print Buffer: 8K
- Friction and push tractor feed
- IBM graphics and Epson compatible
- 15" carriage

Suggested retail: $949



KX-P3151 Daisy Wheel Printer $399
- Letter Quality Printing
- 96 fully formed characters
- Up to 22 cps printing speed
- Bi-directional printing and logic seeking
- Friction feed and optional tractor feed
- Up to 15.5" paper width

Corona Data System

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Complete Package
PC-400 25 ME
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Dual 360KB diskette drives
512KB memory
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MS DOS GWBASIC
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Suggested retail: $1495
Shipping charges: $10 UPS ground

Enhancements

Dresselhaus COMPUTER PRODUCTS

Dots-Perfect
an upgrade kit for Epson FX, JX, RX, MX and IBM graphics printers
You also get Graftrax with MX kit.

Sample of letter with Dots Perfect — Sample of letter without Dots Perfect

- **NLQ** for Epson MX, FX, JX, RX **$65** A Dresselhaus product to enhance your Epson printer to NLQ and SeleType features at the touch of a button. Easy to follow installation instruction is included. Give your model.
- **Epson FX Upgrade $115** An Epson product to enhance your FX-80, 80+, 100, 100+ to FX-85/185: NLQ Printing, 8K print buffer and SelecType features. Available in 4 different kits. Give your model.
- **NLQ** for Okidata ML 82A/83A **$85** A Rainbow Tech product to enhance your printer to NLQ and SeleType features at the touch of a button. Easy to follow installation instruction is included. Give your model. Available in standard parallel and IBM.
- **Buffer and StyleWriter $169** 64K buffer (expandable to 128K) and letter quality printing for Epson MX, FX, Okidata and compatible. A dual function box: straight printer buffer and/or letter quality printing. You pay one low price for this double utilities.

Apple Orchard

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(Genuine AE products, 5-year warranty)

- **RamWorks III** for IIe, 80 column Free AppleWorks desktop super expander RamDrive and printer buffer utility disk.
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  512K.....$209 1 Meg....$279
- **RamFactor** for II, II+, IIe, laser 128 Franklin. Free AppleWorks expander.
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  1 Meg....$299 2-16 Meg..Call
- **TransWarp** accelerator .... **$219** New for II+ or IIe. Speed up your Apple
- **TimeMaster II HO** ..... **$99** Support ProDOS and AppleWorks.
- **ViewMaster** 80 for II+ .... **$109** 80 column board. Free AppleWorks preboot
- **Z-80+** for II+, IIe, laser 128... **$109** 4MHz, with CP/AM4.0 system disk.
- **Z-80C** for IIc with CP/AM disk . **$125**
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  256K.....$149 512K.....$189
- **Z-Ram Ultra 2** Ram & clock
  256K.....$199 512K.....$239
- **Z-Ram** Ram & CP/M for IIc
  256K.....$229 512K.....$269

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Shipping charges: (COD adds $2)		Printer	Others
U.S. continent:	UPS ground	$6	$2
APO/FPO:	Postal ground	$15	$4
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We do not accept COD or credit charges to APO/FPO.

How To Build An AT

by Aubrey Pilgrim

It's a wonderful world we live in. Oh, you may hear some people gripe and complain about the high cost of living for such things as food, clothing and housing. But these people usually fail to consider the real important things in life such as computers and related goodies. While the cost of everything else in the world is going up, the cost of computers is constantly coming down.

A moderately configured IBM PC-AT that costs about $7,000.00 can do more things than a $20,000 computer could do just a few short years ago. It is a powerful tool that can save time, increase productivity and make life easier in hundreds of ways. But many people, small businesses, or even departments in large companies, cannot afford or justify paying $7,000 for an IBM PC-AT. So they may be denying themselves the benefits of this powerful tool.

But you don't have to do without these benefits. You can assemble a powerful PC-AT compatible for less than $2,000 that will do virtually everything that a $7,000 IBM PC-AT will do.

Most of the components for these low cost computers are made in the Far East because of the low cost of labor. Some people might be surprised to learn that most of the components that go into the high priced IBM personal computers are also made by low cost labor in the Far East.

Interchangeability

One of the reasons for the present fantastic computer age and the growth in personal computer technology has been interchangeability. If you are new to the computer world, you may not realize that the IBM PCs and compatibles are merely an assembly of interchangeable plug-in parts.

It was not always so. Just a few years ago, there were hundreds of computer manufacturers and each one had their own unique disk format and operating systems. But, today the vast majority of computer systems are patterned after the IBM or MS-DOS systems. You can take almost any component out of an IMB PC and plug it into a clone or vice versa and it will work. The same for software. Today there is about four billion dollars worth of MS-DOS and IBM-DOS software that will work as well on the clones as it does on the genuine IBM computers.

A Barebones System

It really doesn't take much expertise to put one of these systems together. If you have all the parts ready to assemble it should take less than an hour to be up and running.

Figure 1 shows the basic components needed for a minimum PC-AT system. Here is what you will need and the approximate cost for such a system:

ITEM	COST
1. Motherboard*	$500-700.00
2. Case	70-125.00
3. Power Supply	90-140.00
4. Controller Board	200-250.00
5. 360K Floppy Drive	75-140.00
6. 1.2Mb Floppy Drive	125-150.00
7. Keyboard	60-125.00
8. Monitor Board	75-350.00
9. Monitor	100-550.00
10. 20Mb Hard Drive	300-500.00
	$1595-2615.00

* Motherboards with 80386 CPU and support including 1Mbyte RAM are available.

The prices above are from recent advertisements in the *Computer Shopper*. As you can

continued on page 132

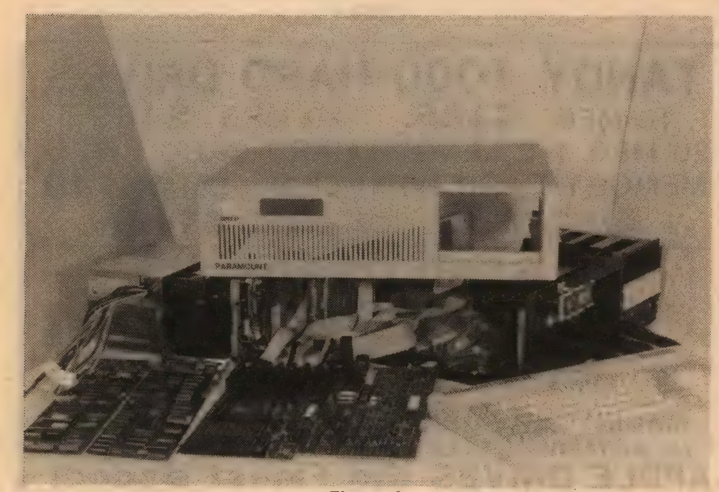

Figure 1

JUST DRIVES...
HARD DISK DRIVE'S AND KITS FOR THE IBM® PC, PC/XT/AT AND COMPATIBLES

PC & PC/XT HARD DISK DRIVE KITS

✻ 10MB SYSTEM	$	300.00
✻ 22MB SYSTEM	$	375.00
✻ 32MB SYSTEM	$	455.00
48MB SYSTEM	$	615.00
86MB SYSTEM FULL HT, 22Ms	$	1,245.00

ALL DRIVES AND KITS SHOWN AT FORMATTED CAPACITIES!!

NEW!! LOW PRICE!! HARD DISK CARD

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★ 21.3 formatted megabytes
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LOCAL & TECHNICAL SUPPORT (408) 378-8378

HARD DISK CONTROLLERS

✻ ADAPTEC 2070A RLL $140.00
★ 50% increase in speed & capacity of disk drives
★ Sector level defect skipping
★ 7.5MB/Sec. data transfer rate

ADAPTEC 2010A MFM $115.00
★ Sector level defect skipping
★ 2:1 sector interleave

✻ OMTI 5520-7 MFM $85.00
★ 1:1 sector interleave
★ Fastest MFM controller

WESTERN DIGITAL WX MFM $85.00
★ Standard IBM PC/XT controller

All controllers carry a 12 month warranty!!

HARD DISK DRIVES

PC & PC/XT DISK DRIVES:

SEAGATE	ST212	10MB	$225.00
✻ TANDON	TM262	22MB, 3½", shock mount	$275.00
TULIN	TL226	32MB, RLL	$300.00
	TL240	48MB, RLL	$415.00

AT DRIVE KITS:

SEAGATE	ST4038	32MB, 40Ms	$575.00
	ST4051	42MB, 40Ms	$725.00
	ST251	42MB, 40Ms, ½HT	$755.00
	ST4096	80MB, 30Ms	$1,180.00
✻ VERTEX	V-170	60MB, 22Ms	$940.00
MICROPOLIS	1323A	42MB, 28Ms	$895.00
	1325	70MB, 28Ms	$1,375.00
MAXTOR	XT1085	71MB, 28Ms	$1,475.00
	XT1140	119MB, 28Ms	$2,750.00

WESTERN DIGITAL 1003 WA2 PC/AT CONTROLLER $200.00

All AT kits include drive, cable, software, mounting hardware, and instructions manual. Kits up to 159MB available!!

All PC & PC/XT KITS INCLUDE: half-height, 5¼" or 3½", low power drive, Adaptec controller, cables, half-height filler panel, mounting hardware, software and user installation manual. Disk kits are preformatted and tested, EASY TO INSTALL, FREE OF DEFECTS. Ready to install format and boot. 12 MONTH INST-X-CHANGE WARRANTY !!

TERMS & SHIPPING: Free fully insured UPS ground shipping on all kit orders. No surcharge for UPS COD (cash, cashiers check, money orders). Orders received by 1 p.m. PST shipped same day, others shipped next day. Overnight and 2nd day shipping available for additional charge. All sales are final. We accept cashiers and certified checks, money orders, and personal checks (order shipped when check clears).

Dealer and volume purchase inquiries encouraged. ✻ HOLIDAY SPECIAL PRICES !!!

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No longer will your peripheral choices be limited by the type of port you have available! Our new High Performance 700 Series Converters provide the missing link. Based on the latest in CMOS technology, these units feature full baud rate selection to 19.2K, with handshake signals to maximize transfer efficiency. Detailed documentation allows simplified installation. Order the Model 770 (Ser/Par) or Model 775 (Par/Ser) Today!

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How To Build An AT

continued from page 131

see there can be a wide variation in the cost of the components. One reason for the price differential is due to the configuration. There are thousands of ways that you can configure the machine by plugging in different components. The lower cost system above would use a monochrome monitor. Or you could configure it with an enhanced graphics adapter (EGA) board and a very high resolution color monitor for about a thousand dollars more.

Since the parts are interchangeable, you can shop around to find the best price. If you can't afford a full-blown system at the moment, you can start off with a low cost barebones system and add to it later.

Assembling The Parts

If you know which end of a screwdriver to use and how to hold a pair of pliers, you should be able to assemble a PC-AT in less than an hour. Though the AT is bigger and more complex than the XT, it is actually easier to assemble.

Figure 2 shows the chassis with a plastic bag of small parts such as the speaker, the disk drive rails, the plastic guides, the keylock, standoffs and miscellaneous hardware. The card guides should be installed in the back of the front panel. A bit of household cement can be used to hold them in place. Some chassis have the keylock assembly already installed. If not installed, it is a fairly simple matter to install it on the front panel. The speaker, with its holder, is installed in the space between the front panel and the card guide panel with a single screw to the side-flange. The speaker cable connects to the pins on the front of the motherboard.

Installing The Motherboard

The XT motherboard requires nine brass standoffs with nuts and washers on each end. The AT motherboard needs only two screws to hold it firmly in place, one in the center at the front of the board and one in the center at the rear. Figure 3 shows a top view of a motherboard. Figure 4 shows the back side. It uses four plastic standoffs that snap in to hold the motherboard up off the floor of the chassis. The bottom end of the standoffs have grooves that fit into the raised slots on the floor of the chassis. Three other standoffs are snapped into holes in the floor of the chassis. These standoffs have horizontal grooves that accept the right edge of the motherboard and hold it securely.

To install the motherboard, snap the three standoffs in place in the floor of the chassis and the four into the back of the motherboard. Lay the motherboard on the floor of the chassis and move it until you feel the standoffs fall into the slots. You then push it to the right until it fits into the grooves of the edge standoffs. You then install a screw in the front center and one in the rear center. Figure 5 shows the motherboard installed.

Installing The Power Supply

The AT power supply is also easier to install than the XT's. The AT chassis has two raised tongues to accept cutouts in the bottom of the power supply. See Figure 6. The power supply is placed on the floor of the chassis and pushed toward the rear. Two screws are then used to secure it to the back panel. The XT power supplies requires at least four screws.

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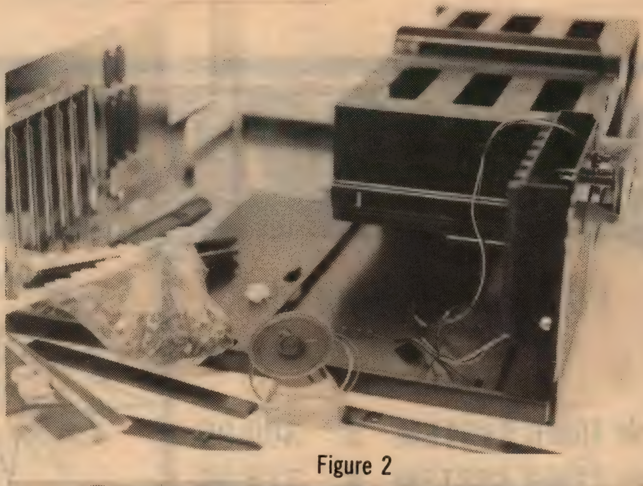

Figure 2

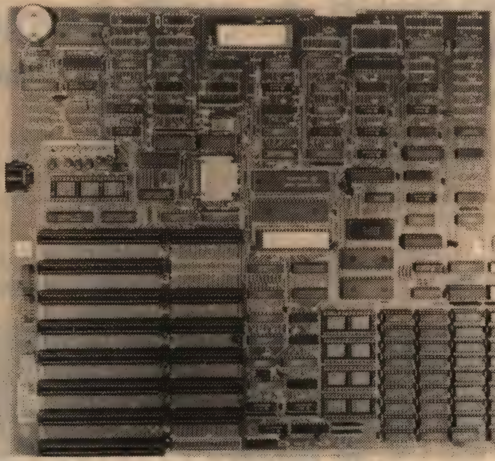

Figure 3

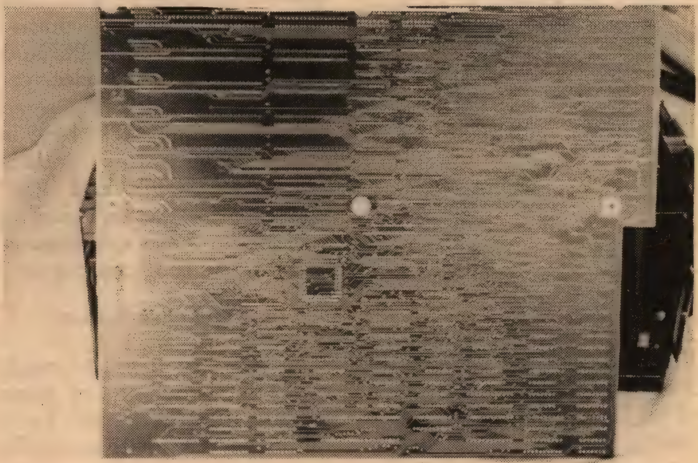

Figure 4

TOP SECRET

SALE! MANUALS

By John J. Williams, EE and former CS Professor, NMSU. All latest editions. 10% OFF orders over $50. (505)-434-0234.

DISK SERVICE MANUAL $20

Maintain, repair, adjust, align drives without special equipment/software - 5.25"/8"/microfloppies. IBM-PC/Compatible, Apple, Commodore, Kaypro, Tandy, Atari, TI, HP, DEC, etc. 100+ photos, figures. Save $$$!

DISK DRIVE TUTORIAL $15

Theory and practical facts on drives, disks, FDCs, formatting, interfacing, software. Same drive types as listed above. Many photos, figures, purchase and use tips.

PRINTER & PLOTTER MANUAL $15

Types, descriptions, specs., and 100+ interfaces (parallel, serial). Plans for Buffer, X-Switcher, Serial-To-Parallel, Parallel-To-Serial and Breakout devices. Repair, maintenance. Many tips. Many photos, figures.

SUPER RE-INKING METHOD $7

Re-ink cloth ribbons for about 50 cents and 10 minutes each. Plans for el cheapo motor-driven re-inker. Commonly available, inexpensive ink (5 colors) and carrier. Save $$$!

COMPUTER PHREAKING $15

Dozens of computer crime methods and countermeasures. How systems are penetrated. BBS advice; password defeats; EMI and audio eavesdropping (TEMPEST, Van Eck methods; crosstalk amps). 200 phreak-term Glossary.

ABSOLUTE COMPUTER SECURITY $15

Dozens of simple, versatile, very secure computer security methods. Plus truly invulnerable MS-BASIC cipher program; $1,000 CIPHER CONTEST rules with 25K+ char. ciphertext. Manual + MSDOS disk - $25.

CRYPTANALYSIS TECHNIQUES $15

Five powerful MS-BASIC programs to ANALYZE and DECRYPT "invulnerable" ciphertext. Manual + MSDOS disk - $25.

AUTOMATIC TELLER MACHINES $20

ATM crime and security. 100 methods described. Actual case histories, law and countermeasures. Photos include ATM interior.

STOCKPRO $15

Make big $$$! Manual + MS-BASIC program for common stocks - Bull/Bear markets. Made for NMSU. Manual + MSDOS disk - $25.

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Plans for many HV devices - Stun Gun, Taser, Prod, Cane, Umbrella, Zapper, Jammer, Flasher, Flashblaster, Jacob's Ladder, Plasma Gen., Van de Graaff Gen., Fence Charger, Geiger Counter, Ozone Gen., Fish Stunner, Pest Killer, Plant Stimulator. Shocking!!

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Super Special 10 MEG REMOVABLE MEDIA DRIVES FOR XT (with 1 cartridge) $525.

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10 MEG $219. 20 MEG $325.

HARD DRIVE SYSTEMS WITH PC CONTROLLERS & CABLES
EXTRA SPECIAL!!! Internal Systems
(add $125. for External)
SEAGATE and MINISCRIBE
10 MEG 1/2 Hgt. $329.
20 MEG 1/2 Hgt. $399.
30 MEG Capacity $489.
6/12 MONTH WARRANTY HARD DRIVES

FLOPPY DRIVES
TEAC DS, DD $99. FUJI DS, DD $87.
CHINON quiet, low power DS,DD $89.
AT 360 $92. 1.2MEG $125. 800K $119.
1 YR. WARRANTY ON FLOPPY DRIVES

TANDY 1000 HARD DRIVES
10 MEG $385. 20 MEG $489.
20 MEG 1/2 LENGTH HARD CARD $625.
MEMORY CARD WITH 512K+DMA $149.
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20 MEG GOLD CARD $595.
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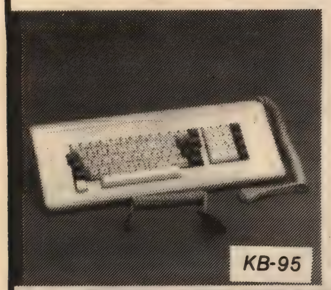

KB-95

- Apple-Franklin compatible
- Programmer keyboard
- Enhance over 40% of keyboard functions
- Microprocessor control with Upper/Lower case
- 42 function keys
- 3 user-programmable keys
- Standard numeric key pad
- Power "ON" light
- Curly-cord connector and connector mate included

S & H $5.00

5¼" DISKETTES $0.75

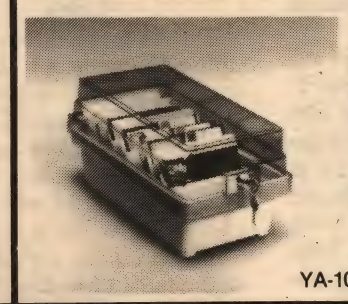
DS/DD G-Neric diskettes
w/hub rings, sleeves & write protect tab (pkg. of 20) **$15**

FREE DISK DOUBLER
with purchase of 100 pcs Diskettes

S & H $3.00

(Note: $3.00 Shipping & Handling required on all diskette orders)

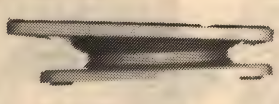
FLIP 'N' SORT $12.95



- Anti-static
- Elegant appearance
- Key lock for file integrity
- Smoke top w/beige base
- Protect up to 100 5¼" diskettes
- Nine movable dividers
- Non-slip guides keep disks upright and flat

YA-100 S & H $4.50

ADJUSTABLE MONITOR STAND $12.95



- Tilts and swivels display
- Rotates 360°
- Tilt-angle adjustable and lockable
- Rubber pads on top and bottom guarantee no slipping
- Holds all size monitors

S & H $4.50

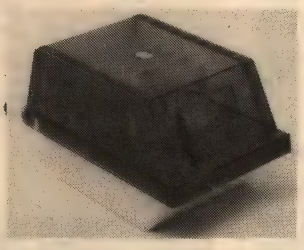
JOY STICKS $17.95

HAND
HELD
DESK
TOP

- Apple II +, IIe, IIc, or IBM pc compatible
- Self-centering w/metal handle
- Adjustable verticle and horizontal
- Hand-held model with AutoFire
- Please specify II +, IIe, IIc or IBM pc on order

S & H $4.00

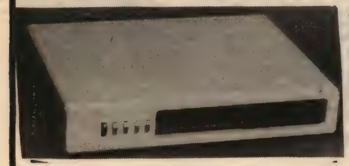
FLIP 'N' CARRY $11.95



- Anti-static
- Built-in carrying handle
- Elegant appearance
- Smoke top w/white base
- Protect up to 50 5¼" diskettes
- Five movable dividers
- Non-slip guides keep disks upright and flat

YA-50 S & H $4.50

IBM EXTERNAL SYSTEM $150


EXET-1 S & H $10.00

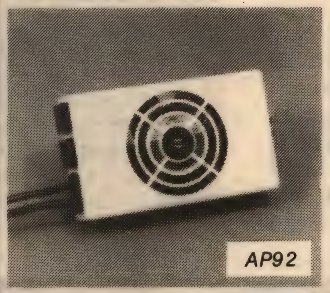
- Beige color
- Power command center, one master switch and four subswitches with four sockets
- Built in power supply, 65W. + 12V/2.5A; + 5V/6A; – 12V/0.5A
- Two half height drive slot
- Built-in cooling fan
- Built-in surge protection/EMI filter 15" × 19½" × 3½"

DISK DOUBLER $6.95

- Accurate position guide
- Hand-held compact design
- Square notch-cut
- Sturdy, all-metal construction

S & H $4.00

COOLING FAN $29.95


AP92

- New super-thin design
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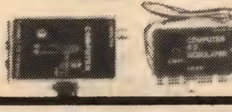
- Dual outlets for monitor and printer
- Heavy duty switch w/power on pilot light
- Built-in power surge protection
- Also fits Commodore model 1541 drive

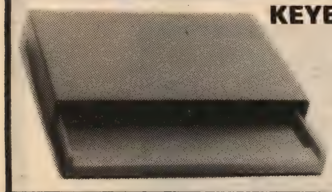
S & H $4.00

RF MODULATOR SET S & H $4.00 $9.95



- RF Modulator
- TV Interface
- Coaxial Cable

KEYBOARD DRAWER



S & H $10.00 **$49.95**

- Slides out on ball-bearing glides and locks.
- Steel platform with baked-on beige enamel finish to match your PC
- Space-saving size: 3⅝"h x 22"w x 15½"d

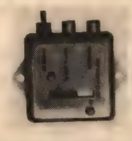
EXTERNAL PORT

ONE PORT **$4.95**
FOUR PORT **$12.95**

- Apple II + I/O extender
- Easy access to I/O
- One-port or four-port available
- Control by individual switch

S & H $4.00

VIDEO 'FLIPPER' $9.95



- Easily flips from 40 to 80 column mode and back
- One computer to two monitors connection and select
- Two computers to one monitor connection and select

S & H $4.50

ANTI-GLARE PANEL

• **M12 - Fit 12" monochrome monitor**	**$14.95**
• **C12 - Fit 12" color monitor**	**$17.95**
• **M14 - Fit 14" monochrome monitor**	**$17.95**
• **C14 - Fit 14" color monitor**	**$19.95**

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FLOPPY DISK DRIVE $125.00

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- Apple compatible
- 5¼" Half-height
- 150(W) × 50(H) × 220(D)mm

S & H $6.00

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16K RAM Card - II & II/+ upgrade to 64K	**$35**
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80 Column Card - soft switch with inverse video chip for II/+	**$60**
Extended 80 column with 64K RAM - II/E	**$35**
Printer Card with cable - centronics parallel, II/+, II/E	**$35**
1 M Ram Card - II/+ & II/E	**$300**
Power supply - heavy duty, straight connector, II/+, II/E	**$60**
Case & keyboard with numeric key pad - II/+	**$75**

S & H $10.00

MONITOR

Hi-RES, 12" AMBER, composite input	**$100**
Hi-RES, 12" AMBER, TTL input built-in swivel	**$125**

S & H $12.00

IBM COMPATIBLE

Monochrome graphics/parallel printer port	**$119**
Color/graphics interface card	**$95**
Floppy disk drive card - 4 drives	**$50**
Multi I/O plus card - 2 ASYN communication port	**$99**

1 Parallel printer port, 1 joystick port,
1 Clock/Calendar with battery back up.

S & H $4.00

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Keyboard - 5150	**$75**

S & H $8.00

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How To Build An AT

continued from page 132

The AT power supply is exactly like the XT except that it is usually larger and can output about 200 watts. It has six cables, two for the motherboard power and four identical cables for disk drives.

The two cables for the motherboard are usually marked P8 and P9. They plug into the connector at the edge of the board. Make sure that P8 is nearest the back of the board and that the four black wires are in the center when both cables are plugged in. See Figure 7.

The four cables for the disk drives are identical and will power two hard disks and two floppies or any other combination. The connectors are formed so that they can only be plugged in one way.

Installing The Disk Drives

There are two plastic rails that are screwed onto the sides of the disk drives, both floppies and hard disks. These rails then allow the drives to be slid into grooves that are formed in the chassis. This makes it very easy to install the cables before the drive is pushed all the way in. See Figure 8. After the cables are plugged in, the drive is pushed all the way in and small brackets that require a single screw is placed in front of the rails to hold the drives in place. See Figure 11. When the cover is installed these brackets are inaccessible. When the key is locked the cover cannot be removed so that your drives and boards are safe.

Installing The Controller Cables

The AT uses a different controller than the XT. The AT controller can control both floppies and hard disks. Figure 9 shows three ribbon cables attached to a controller. Two of the cables are 34 wire cables and the other one is a 20 wire ribbon cable for the data lines to the hard disk. The 34 wire cables may have two connectors for handling two drives each. One connector will be in the middle of the cable and one on the end. The connector on the end will be split and some of the wires twisted. This connector will be plugged into the floppy that will be A drive. The connector in the middle will be plugged into the B drive. Some of these cables are keyed so that they will plug in only one way. If they are not, look for a red or blue wire on one side of the cable. This should indicate pin one and is usually plugged in so that the colored wire is to the outside of the drive. The 34 pin edge connector on the back of the drive has all even numbers on the top and all odd numbers on the bottom. Most drives will have a numeral 2 at the edge of the connector and a 34 on the other end. Most connectors also are numbered but you may have to look closely. Figure 10 shows the cables attached to the floppy A drive.

The hard disk drives also use a 34 pin connector and ribbon cable along with the 20 pin connector and cable. Again look for the numbers on the board to match the numbers on the connectors if the connectors are not keyed.

There are several types of motherboards on the market

continued on page 138

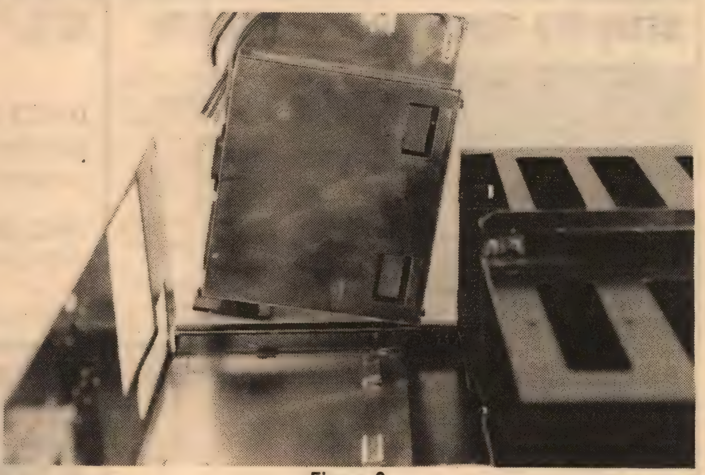

Figure 6

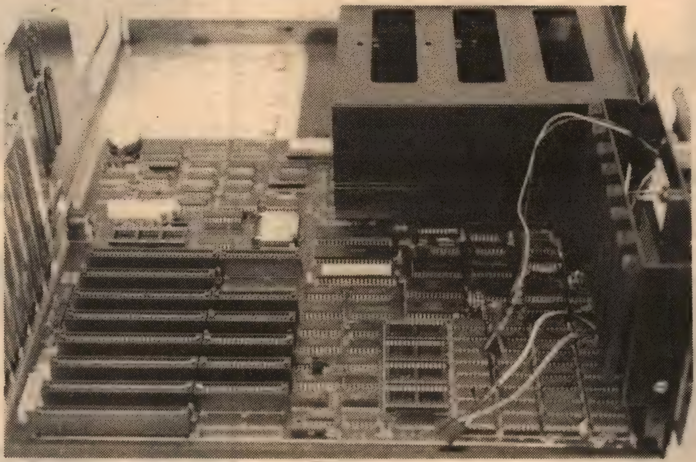

Figure 5

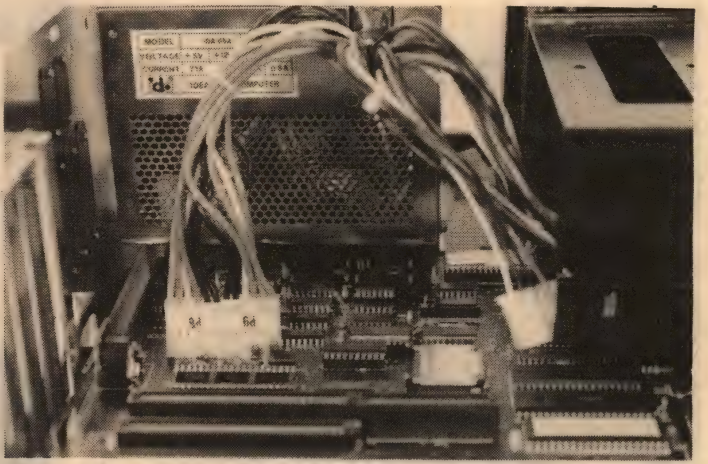

Figure 7

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- Real-Time Clock/Calendar
- Battery Back-Up
- Game Port

BSI Monochrome Graphics Card
- Hercules Compatible
- 720x348 Graphic, 80x25 Text
- Parallel Printer Port
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BSI Color Graphics Card
- 320x200 4 Color
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- Mounting Hardware Included
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- UL Recognized

AT/XT Keyboard
- 84 Keys
- 5060 Type Heavy Duty

Portable XT System
- 8088-2 CPU, 4.77-8 MHZ Keyboard, selectable 8087 Socket
- 640K RAM On Board
- Six Full Length Expansion Slots
- Multi I/O Card
- Built-in 9" High Res. dual Freq. Monochrome Monitor
- 135W Switching Power Supply
- Three Half-high Disk Drive Space
- Power Lock Key & Hardware Reset
- Low Profile, Full Travel 83 Keys Keyboard
- Weight 30 LBS. (dual floppy system)

Portable AT System
- 16-bits 80286 CPU, 8-10 MHZ
- One 8-bit, Five 16-bit Full Length Expansion Slots
- 512K RAM On Board
- FDD/HDD Controller
- 1.2 MB Floppy Disk Drive
- Built-in 9" High Res. dual Freq. Monochrome Monitor
- 200W Power Supply
- AT Keyboard
- Weight 35 LBS.

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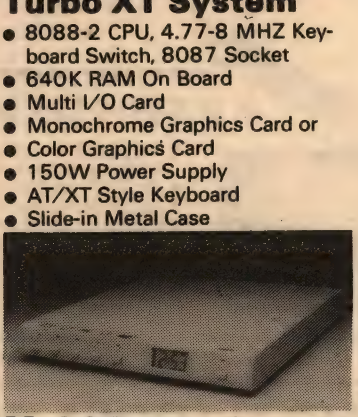

Multi Power Center
- Master Switch Controls Five Power Outlets
- Surge & Spike Protection
- Turn Table Botton Work as Swivel Base
- LCD Quartz Clock

80386 Computer
continued from page 130

code compatibility with the programs created for Intel's entire 16/32-bit CPU family including the 8086, 8088, 80186, 80188, and 80268. It has a virtual 8086 mode that will run MSDOS and even run them at the same time as other programs, even ones written in 32-bit code. The 80386 will provide for multi-users running on the same computer with their work being protected from being over written by other programs. It also provides for multi-tasks running at the same time. Other CPUs have done this type of processing, but the 80386 has more flexible modes of managing both the physical and virtual memory than previous chips. One mode of memory management uses variable-length units of memory called segments, the other uses fixed length units of memory called pages. The 80386 uses both modes and in addition permits the pages to be composed of variable-length segments. This is the briefest description of the architecture of the 80386 and *Computer Shopper* will carry a detailed description of this CPU in the future. I merely want to impress you with the complexity of this mainframe-on-a-chip so that you have some concept of the requirements for a complex DOS to control it.

Microsoft has provided us with MSDOS and tried to upgrade our experience by incorporating more and more Unix-like features in the system. They have not promised us a version of MSDOS which will operate all the modes of the 80386. I for one do not think that it can be done, not even by Microsoft, or even IBM. I believe that the solution will lie in a form of Unix that will run MSDOS software as a subset in the virtual 8086 mode only and perhaps in a limited way in the multi-user mode. This is why the software developers are nervous.

In any event, one thing that this Comdex has done is to bring the 80386 to the forefront as the hardware and software developers goal.

This industry is like a seesaw, first the hardware outruns the software and it takes a while for the software to catch up. Then the software overloads the existing hardware and waits for new hardware power to come along. Then the next cycle starts. The power of the 80386 will not be utilized for a long time because it has far outstripped not only the application software but the basic operating systems we are used to using. ●

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Timeslips
continued from page 96

codes may be job numbers, purchase order numbers, characters or symbols that help users organize their work and subtotal bills. When the reference field is used in this way, an infinite number of combinations is allowed.

You may also set up a list of 128 projects or matters for each account. These are inserted into the reference field as a special code number. The code is later translated into a 38-character phrase that can be printed and subtotalled on bills and reports.

Dates—Slips have room for both a starting and ending date.

Times—Timeslips include "projected" and "accumulated" time fields.

Billing Rates and Options—Timeslips can monitor and calculate billable time based on any of the hourly rates assigned to the "User," "Account" or "Activity," or all three. Users may stamp slips "Do Not Bill," "No Charge" or "WIP" (for "work in process"). By stamping timeslips WIP, users may accommodate long term projects and prevent these slips from getting billed until desired.

Keeping track of and billing out-of-pocket expenses is a problem that has plagued professionals for years. Timeslips solves this problem by allowing users to change a timeslip to an "expense slip," and log the expense details right on the screen. Expense slips include "quantity" and "amount" fields instead of the projected and accumulated time fields provided on regular timeslips.

The TSTIMER module also lets you perform fast searches of slips marked WIP, or by User, Account, Activity, Reference Number, or date.

Bills are created in the TSREPORT module using the time and expense information recorded in the TSTIMER module. TIMESLIPS' flexible billing capabilities allow users to select from thousands of billing formats and associate each account with a combination of billing options to prepare concise, customized bills. You can store a default bill format which may also be modified on a per client basis.

In addition, you can review each bill (on the screen or on paper) and change, modify or reject any items(s). Or choose to include and detail time, charges, user names or initials, activities, individual dates, and previous balances including aged receivables (30, 60, 90 days and over).

You can specify several levels of detail, such as billing increment, retainer account balance, or aging of receivables. The program allows for up to 64 non-time related items (per client per billing cycle) that require mark-up or discount, and sales or service tax.

Write up or write down bills by a flat dollar or percent amount are also possible. Adjustments may be made against time charges, expense charges or the entire bill.

Another capability of this module allows charge by several types of flat fees including: absolute (always charged), minimum (never less than), or maximum (never more than). Flat fees may cover time charges, expense charges or both. You can also do the following: manage retainer and trust accounts; batch process up to 240 bills from any Timeslips directory; configure a printer with user-defined setup codes, and move the client's name and address to any place on your stationery; add user-definable billing phrases to bills, such as: "Payment, Thank You" or "For Professional Services Rendered"; file, list, sort, and print (on file folder labels, mailing labels, or envelopes) some or all of their client names and addresses; keep a complete history of billed and unbilled hours, fees and costs (the system also accumulates a twelve month billed/paid history for each account).

Timeslips helps you ascertain if you are spending more time on flat fee work than the flat fee justifies, or if your hourly rate covers overhead and leaves enough to earn a living. You can figure out if you are going over-budget on projects, and which of your employees are accruing the most billable time.

To give you the answers to these questions, Timeslips' TSREPORT module produces several reports and graphs (without special hardware) that may be sent to a screen, printer, disk file (in ASCII image format), or spreadsheet or database program (such as Lotus 1-2-3 or dBase). These reports and graphs include:

Detail reports—Details the entire contents of each timeslip selected, including grand totals and up to four levels of subtotals.

Summary report—Four types: User totals, Account totals, activity totals and account balance summary with aging.

Client Billing Worksheet—Summarizes new activity, unbilled timeslips and expenses, unposted payments, aging history, most recent bill date and balance, adjustments, tax calculations and flat fee analysis.

Billing History Report—Tracks billing information on an accumulated or year-to-date basis as well as on a monthly basis.

Client list—Alphabetically sorted by name with address, phone number and client number. The system can also print out lists of users, activities, and matter/project codes.

IRS Report—Helps justify a computer as a business expense by keeping a log of computer usage.

User-defined Format—Allows you to export data to spreadsheets, general databases or word processors, and to design customized reports suitable for printing by selecting any group of data fields in the system.

Graphics—Thirty types of pie charts and scrolling bar graphs show hours, dollars, or dollars per hour by user, account or activity and can compare projected vs. accumulated and billable vs. unbillable time.

Retainer/trust account report—Shows all transactions to and from the client's retainer or trust account.

Matter/Project report—Comprehensive listing of every active matter or project by client.

The package includes a clearly written, 150-page manual complete with a "One Hour Tutorial," "Super Quick Start Lesson," and sample applications chapter. The software is also well-documented on-line with directions at the bottom of every screen. If more explanation is needed, users can press the [F1] key to get context-sensitive help on-line at any time. North Edge Software provides telephone support at no additional cost.

Timeslips requires an IBM PC/XT/AT or compatible hardware system, 256K of RAM, and two floppy disks or one floppy and one hard disk. It is not copy-protected.

For more information, contact North Edge Software, P.O. Box 286, Hamilton, MA 01936. (617) 468-7358. ●

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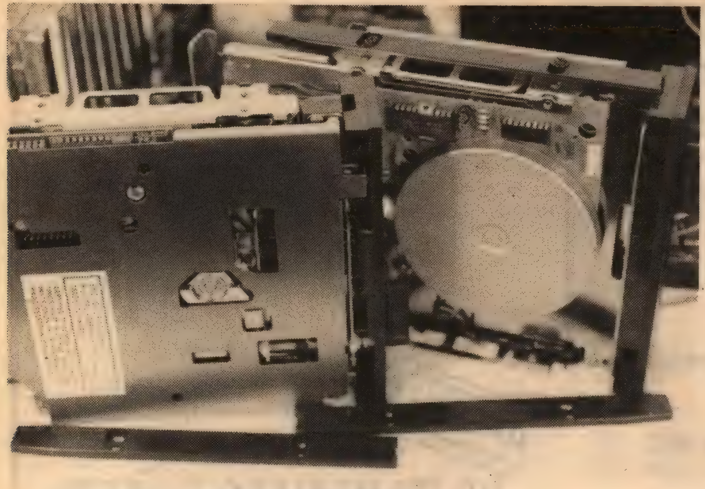

Figure 8

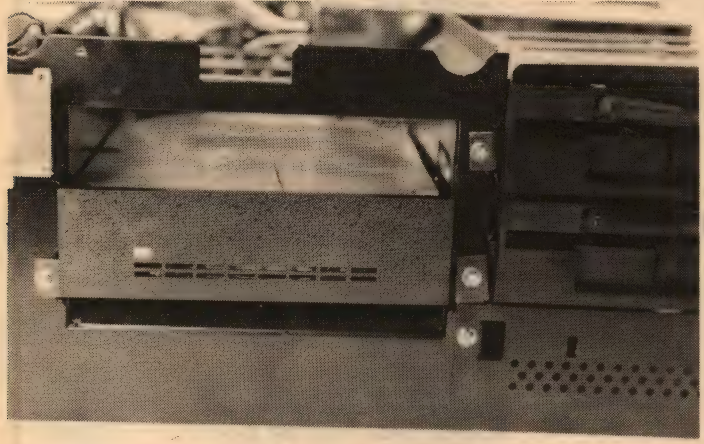

Figure 11

How To Build An AT

continued from page 134

and some of them have slight variations. On my unit the keylock plugs into a connector on the front of the motherboard. A green LED lights up when the power is on. The red LED is plugged into a connector on the front of the disk controller board and it lights up whenever the hard disk is actively storing or retrieving data.

The keylock can disable the keyboard without turning off the power. If the key is turned off and removed, you could pound on the keyboard all day and it would ignore you. If you happened to be in the middle of a job in a large office, you could turn off the keyboard, remove the key and take a break without worrying about someone fooling around with your computer while you were away.

Most of the keylocks also have a bracket that locks the cover so that it can only be removed when it is unlocked. I work in a large company where there are several XTs. One person came in one morning and turned on his computer and nothing happened. Then he noticed that the cover was loose. When he pulled it off he found that someone had removed all of the plug-in boards. The AT keylock can prevent this sort of thing.

Installing The Cover

The cover is slipped over the chassis and five screws on the back panel holds it in place.

The Keyboard

All that's left to do is plug in the keyboard into the keyed plug on the back of the motherboard and start hacking. Note that the keyboard for the XT will not work on the AT. They both look exactly alike and have the same connector but there are some internal differences between the two. Some of the clones have a small switch on the bottom of the keyboard so that it can be switched to operate on an XT or AT.

Some Caveats and Recommendations

You may have seen ads for AT systems that vary from $900 up to $3,000 or more. As you might suppose, there is a wide variation in what some people consider to be a system. You should read the ads carefully to determine just exactly what is being offered. If the advertised system has a very low price it may not include the monitor, disk drives, keyboard and other boards and components necessary for a basic system.

The biggest expense will usually be the motherboard. With 1Mb of RAM and the BIOS and 80286 CPU it may cost as much as $700 or more. For instance, I recently saw an ad for a $1,895 system. It listed 19 different items. Twelve of the items listed were features found on most of the motherboards such as a clock/calendar, eight expansion slots, BIOS and other standard features. The other seven items

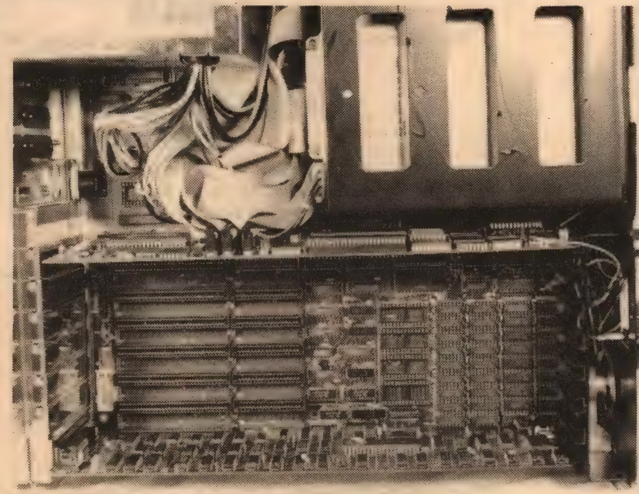

Figure 9

continued on page 139

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PLEASE CALL FOR OTHER PRODUCTS!!

How To Build An AT

continued from page 138

listed was for a motherboard, a keyboard, a 1.2Mb floppy drive, a power supply, a disk controller, a monographics card and a monochrome monitor. If we figure the average cost of the six items other than the motherboard it would total about $900. So this vendor was asking about $1,000 for the motherboard.

An ad from another vendor offered a system for $899. This "system" consisted of a motherboard, a case and a keyboard, this vendor was asking about $600 for a motherboard.

Vendor Support

Price alone should not be your only consideration. Even though it is a snap to assemble one of these units, it is quite possible that some of the units will not work as they should.

Bill Boutin, the owner of Paramount Electronics in Sunnyvale, told me that 30 to 40 percent of the boards and components that he receives from the Far East are defective. He has several technicians who bench test all of the components before they are sold. He says that it is much less expensive to do this testing than to try to find a defect after a system has been assembled.

A friend of mine recently put a system together and it seemed to work fine. He installed dBASE III +, WordStar 2000, several games and other software programs. They all worked great. But when he tried to install Lotus 1-2-3, it would not run. He had a clone EGA board and a very high resolution monitor. He thought it might be either the EGA board or the monitor. He changed them but Lotus still would not run. He took it back to the vendor and he installed a different BIOS on the motherboard. It still would not run Lotus. Finally the motherboard was changed and it now runs everything that he has tried.

By all means try to find out if the vendor has tested the boards before you buy them. And find out what kind of support is offered. If you buy a system, connect the power supply, the boards and drives before you mount them in the case. Turn it on and see if it works before you install everything. If everything is right it should boot up immediately.

You should be aware that the AT uses low power CMOS memory circuits to hold part of its BIOS and other routines. An on board battery that can last about three years supplies power for these circuits. The first time the computer is turned on it will need a special Diagnostics disk to set the on board clock/calendar, amount of memory and drive information. Your vendor should supply you with one of these disks.

Many vendors offer barebones systems that they have assembled and tested for approximately what it would cost if you bought the components separately. If you are not too familiar with computers and the myriad of things that can go wrong, I would suggest that you try to get a basic system that has been tested and debugged.

Once a system is up and running, you can add boards and other goodies later. If it fails when you plug in a new board or component, then you can be fairly certain where the fault lies.

A semiconductor should last almost forever if it is in a circuit that is designed properly so that it is not overheated or too much current is pushed through it. If it is going to fail, it will usually do so within the first 168 hours. So you should turn your computer on and let it run for about a week.

Software

You will need DOS 3.2 and probably GW-BASIC. I have seen them advertised for as little as $80. Most vendors will give you a discount if you buy your system from them.

The 80286 CPU used in the AT can address up to 16 megabytes. But DOS 3.2 limits it to 640K, the same as the XT. The 80286 can also handle hard disks with hundreds of megabytes but DOS 3.2 limits it to 32 megabytes. There are several software packages that will allow the AT to address the full 16 megabytes and large multiple hard disk systems.

It is expected DOS 5.0 will be released soon and that it will allow the 80286 to operate at its fullest capability.

My Computer

I have built several XT clones and have spent lots of money updating them, adding memory, accelerator boards and other goodies. But after putting together my fantastic AT and using it for a while, it makes me want to throw rocks at my old XTs. It's a marvelous machine. ●

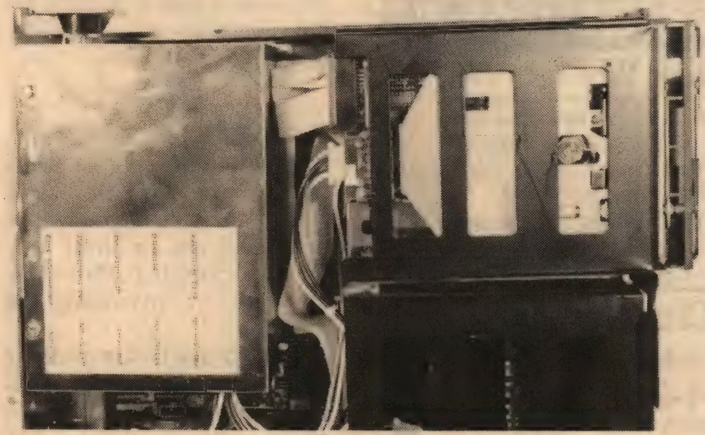

Figure 10

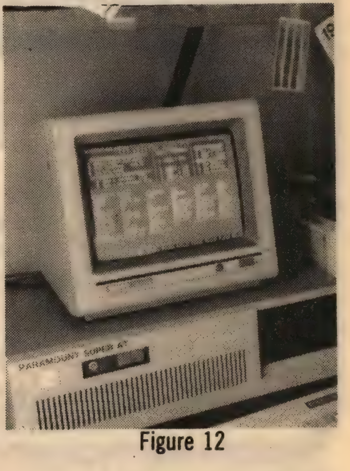

Figure 12

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INT.EXE—Listing Your Interrupt Vectors

by Andrew M. Fried

A Utility Program

The IBM family of microcomputers are often referred to as interrupt driven systems. The reason is simple; all of the ROM BIOS routines along with most of the DOS function calls are invoked through the use of interrupts. On PCs, there are 256 interrupt vectors available. The use of these various interrupts is shared by DOS, ROM BIOS, BASIC and user programs.

When an interrupt request is generated, whether by hardware or software, the CPU saves certain address information on the stack (an area of memory set aside for temporary storage), looks up the vector of the interrupt handler and then performs a call to that address. Upon completion of the interrupt, the information previously stored on the stack is removed and the code segment and instruction pointer is restored. This enables program execution to continue as though nothing had happened.

INT.EXE is a program which enables you to quickly and easily obtain vector information for one or more interrupts. This is particularly important if you are developing interrupt driven routines or memory resident routines (terminate and stay resident programs, or TSR for short). In addition to locating all of the interrupt vectors, the program will scan upper memory for optionally installed ROMS (often found in hard disk controllers, EGA cards and certain dedicated hardware interface devices). INT.EXE was written in Microsoft C Version 4.0 but should be easily adaptable to other C compilers.

Syntax

INT.EXE may be called in three different ways. To begin with, if you type either "INT HELP" or "INT ?" you will be presented with a short help menu describing the three methods of invoking the program.

The first method of invoking the program permits you to obtain the memory address of a single interrupt vector. The format of the call is "INT n," where n is the decimal value of the interrupt you wish to obtain. You will be presented with a copyright notice and then a single line like:

```
"010 [0x0A] 0070:0325"
```

You can see that the first column represents the decimal interrupt number. The second column provides you with the same value only displayed in hex. The third column represents the actual address in memory of the interrupt handler. It is in the standard "SEGMENT:OFFSET" format.

If you wish to obtain a group of two or more interrupt vectors, you may use the same syntax as used above; the only difference is a second interrupt vector is specified. INT will then list all of the consecutive interrupt vectors falling between the first and second. The syntax is "INT n1 n2." The output produced is exactly like that of the first example except that more than one vector is output.

Finally, the last method of obtaining the interrupts is to type "INT" by itself. Using this syntax, all of the interrupt vectors (from 0 to 255) will be displayed. The format of each interrupt vector is identical to the above example; the only difference is that the program will print the information three across. This option also produces the printout of all user installed ROMs.

Output To File

Using simple redirection, output from my INT program may be redirected to an ASCII text file in lieu of the screen. This is particularly useful for making "before" and "after" dumps. If you wanted to send the output to a file called "DATA.1," you could invoke INT with the syntax "INT > DATA.1." DOS would automatically create and send all output of INT directly into the DATA.1 file. The DATA.1 file could then be copied to the printer, typed to the screen or manipulated using any text editor.

How It Works

When the IBM PC was created, certain areas of memory were reserved for specific purposes. The information we are concerned with, the interrupt vectors, lie at the very beginning of memory.

Since each address consists of a double word (four bytes), the total amount of memory allocated towards the interrupt table had to be 1024 bytes, or 1K. This results in all RAM between the address of

continued on page 142

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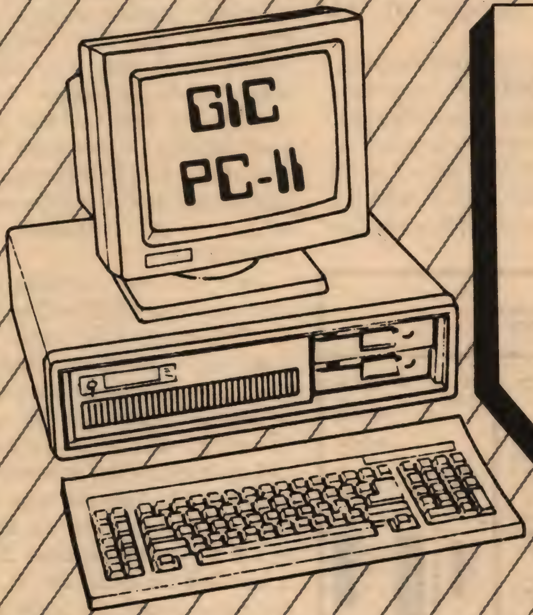

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INT.EXE

continued from page 140

0000:0000 and 0000:03FF being used exclusively to contain the interrupt vectors.

There is one small level of complexity in obtaining the data from the tables; all information in the vector area are stored with the least significant byte first, least significant word first. In other words, the addresses are stored not only in offset:segment order but the actual bytes making up the offset and segment are also reversed. This is a minor problem to overcome, though.

I want to mention that there is one additional method of obtaining the interrupt vectors without having to resort to memory peeking. Using Interrupt 21h, which is often referred to as a DOS function call, there is a particular request available which returns the information to you. For this program, however, it was simpler to "bypass" DOS and obtain the information directly.

Obtaining information on optional ROMs is fairly simple as well. When the IBM performs a POST (power on self test), one test routine that is called scans memory beginning at C800:0000 in 2K chunks. At every 2K boundary, my program simply looks for a two byte signature consisting of "55AA." This indicates a ROM has been installed at this address.

Locating information on installed ROMs is important because often times standard interrupts are redirected to point to a ROM instead of the standard ROM BIOS address. A good example of this involves a hard disk controller card.

The original ROM BIOS found in the PC did not provide support for the hard disks; their only support under interrupt 13h was for floppies. When hard disk controllers were made available from third party vendors, the support lacking in interrupt 13h was added to a ROM attached to the hard disk controller card which was installed at C800:0000.

Part of the installation routine of the ROM redirected the interrupt 13h vector to point to the ROM installed on the hard disk controller card. When an interrupt 13h was issued, the ROM on the hard disk controller card determined whether the request was for hard disk services or the floppy. If it was for the fixed disk, it handled the interrupt. If, on the other hand, the interrupt was for the floppy, it merely transferred control back to the original ROM BIOS handler. My program will advise you of the presence of these optional ROMs. (see page 153)

I'll be happy to provide you with the source code as well as the compiled code in diskette form. Send you name and address along with $10 to cover handling and shipping to: Andrew M. Fried, 895 Cynthia Drive, Titusville, FL 32780. ●

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Prodesign II CAD System

Reviewed by Lon Andrews

Most Computer Aided Design Systems are in a price range that the average user won't consider for casual usage. There are several in the $200 to $500 range that appear in the libraries of the non commercial casual user. Prodesign II is one of these but it is also one that will stand up under commercial use for all but the most demanding applications.

Prodesign II is to a designer what a word processor is to a writer according to American Small Business Computers. Not being an architect or an artist I have to take them at their word for that statement. I have, however used several CAD systems on the IBM compatible (and the Model III/4) mostly for simple plans and the like. The IIIs and 4s had to be equipped with high resolution graphics boards in order to use the systems. As a matter of fact I went out and purchased a multi pen plotter just for this purpose (a purchase I still haven't heard the end of and probably won't as long as I live).

This package requires an IBM PC or compatible with graphics capability with at least 512K, two drives (or a fixed disk) and a printer or plotter.

Several things about Prodesign II that make it stand out are obvious as soon as you look at the hardware it supports. I lost count of the printers it supports when I passed 50 and it's nearly the same for plotters. 5 different mouse devices, 14 digitalizers and 20 computers are listed on the hardware list. This multitude of devices gives this program a lot of value since in all probability you won't have to purchase special equipment. As a matter of fact Prodesign II produces excellent drawings on an ordinary inexpensive dot matrix printer. More about this later. EGA boards, Sigma 400, Hercules Graphics boards and others are supported by this program.

This package requires very little in order to set it up. Using two disk drives all you need to do is make backup copies of the Prodesign disks and run a short setup program. If you are on a hard drive simply copy the programs up to the drive and run the setup. Prodesign supports the 8087 math coprocessor to speed up the processing. I recommend the use of the 8087, if you can, as it takes a while to process the data for the drawings. Anything that speeds it up will be a blessing.

This package arrives with three disks, an attractive manual (185 pages) in a plastic shelf binder, a keyboard template for commands and a quick reference card. The binder is fine for storage but cumbersome for reference. I moved the material to a smaller binder that will lay on the desk without taking up so much room. Perhaps a takeout binder that could be returned to the storage case would be a better idea.

Of the three disks only two are needed. The #1 disk is used by all and the #2 or #3 is used depending on whether or not you have the 8087 chip. I also have 4 disks of example drawings that I picked up from a friend. The drawings take up a lot of storage. The drawing of the SR71 Blackbird requires 75,089 bytes and the Honda 183,385 bytes of storage. Manipulation of all of this data and the calculations necessary for printing takes quite awhile. I am using a Tandy 1000 without an 8087 and the Honda drawing took almost twenty minutes to process and print. Most of the time was spent waiting on the computer. The 1000 hasn't been known as a speed wagon anyways. Time to get the 8087 and a 1000SX. On a faster computer the time should be reduced by about 75% (with the coprocessor).

While a hard disk isn't required to run Prodesign II it is

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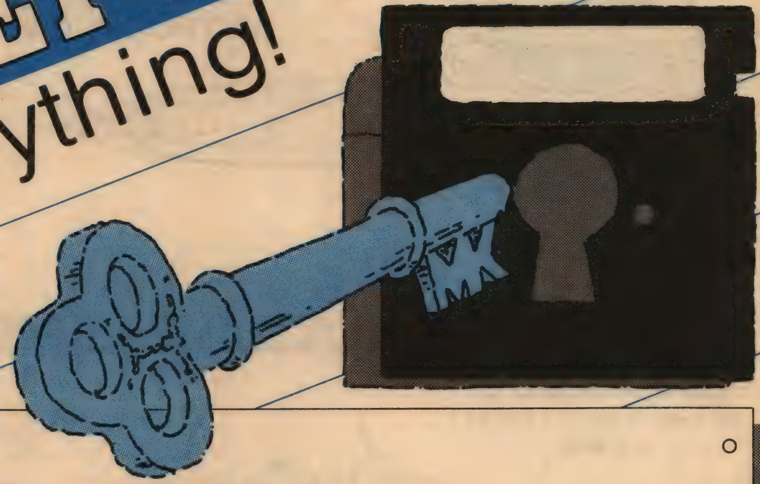

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```
A>DEBUG
-N PROGRAM.COM
-L
-D 100 129
33CB:0100  EB 0B 40 05 56 65 72 73-20 31 2E 38 31 50 B4 30   k.@.Vers 1.81P40
33CB:0110  CD 21 86 E0 3D 36 01 72-05 3D 0A 02 76 09 BA CB   M!.`=6.r.=..v.:K
33CB:0120  03 B4 09 CD 21 CD 20 58-EB 2F                     .4.M!M Xk/
```

turn this: into this

instantly and automatically with a turn of MASTER*KEY!

Without MASTER*KEY, how long do you think it would take to find out this program wasn't running because you had the wrong version of DOS?

```
OFST  ASCII  OBJCODE       SRCECODE
""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
                           ;Program:  PROGRAM.COM
0100         EB0B          H0100:  JMP    H010D
                           ;-----------------------------------------------------
0102         40                    INC    AX                 ;NON-BRANCHED CODE
0103   Ve    055665                ADD    AX,6556h
0106  rs     7273                  JB     H017B  ;. . . . . . . . . . . . . . .
0108   1     2031                  AND    [BX+DI],DH
010A  .      2E                    DB     2Eh
010B  81     3831                  CMP    [BX+DI],DH
                           ;-----------------------------------------------------
010D  P      50            H010D:  PUSH   AX
010E   0     B430                  MOV    AH,30h
0110   !     CD21                  INT    21h                ;get DOS Version#
0112         86E0                  XCHG   AL,AH
0114  =6     3D3601                CMP    AX,0136h
0117  r      7205                  JB     H011E  ;. . . . . . . . . . . . . . .
0119  =      3D0A02                CMP    AX,020Ah
011C  v      7609                  JBE    H0127  ;. . . . . . . . . . . . . . .
011E         BACB03        H011E:  MOV    DX,03CBh
0121         B409                  MOV    AH,09h
0123   !     CD21                  INT    21h                ;display string, DX
0125         CD20                  INT    20h                ;terminate normally
                           ;-----------------------------------------------------
0127  X      58            H0127:  POP    AX
0128   /     EB2F                  JMP    H0159
                           ;-----------------------------------------------------
```

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MASTER*KEY is an intelligent MS-DOS Disassembler. It produces easily readable self-documented assembly language segmented source files that can be edited with any ASCII file test editor or Word Processor then re-assembled using MS-DOS Debug, Assembler, or Macro Assembler and linked with other object modules if desired. It handles object code from the 8088, 8086, 8087, 80186, 80286, and 80287 processors. It decodes into MS-DOS 2.0, 2.1, 3.0, and 3.1 from **BOTH** COM and EXE files.

MASTER*KEY includes a Source Code Formatter and Cross-Reference Generator. The Formatter produces a documented source listing identifying all ROM BIOS and DOS Functions and Interrupts. It serves as an object code optimizer by helping to identify stack areas, temporary storage, ASCII strings, and unnecessary code. The Cross-Reference identifies the number and location of all labels, symbols, functions, and interrupts.

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Prodesign II CAD

continued from page 143

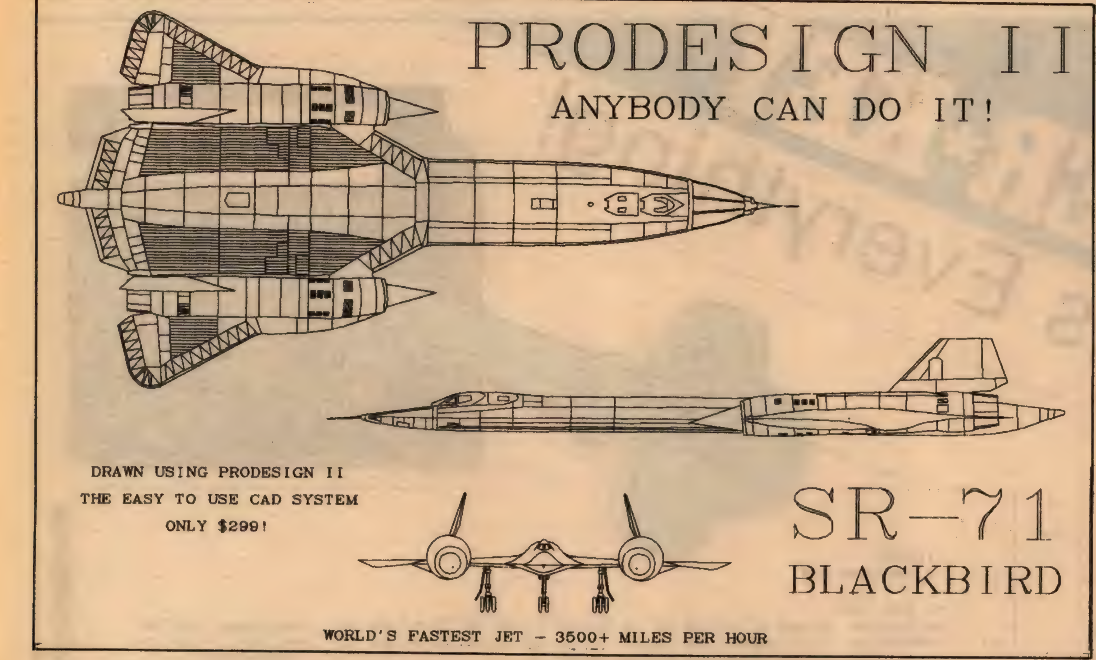
a big help. Loading the drawings from a floppy takes time. Loading the SR71 drawing required 3:20 from a floppy and 2:25 from the hard disk. Time is a major consideration with the operation of this program, and others like it. If you are going to be using it a lot you need to consider your choice of machine carefully or you will spend a lot of your day waiting on the computer to catch up. I would have liked to have the Wells Astra back (see last month's issue) to run this program at 12Mhz as a comparison.

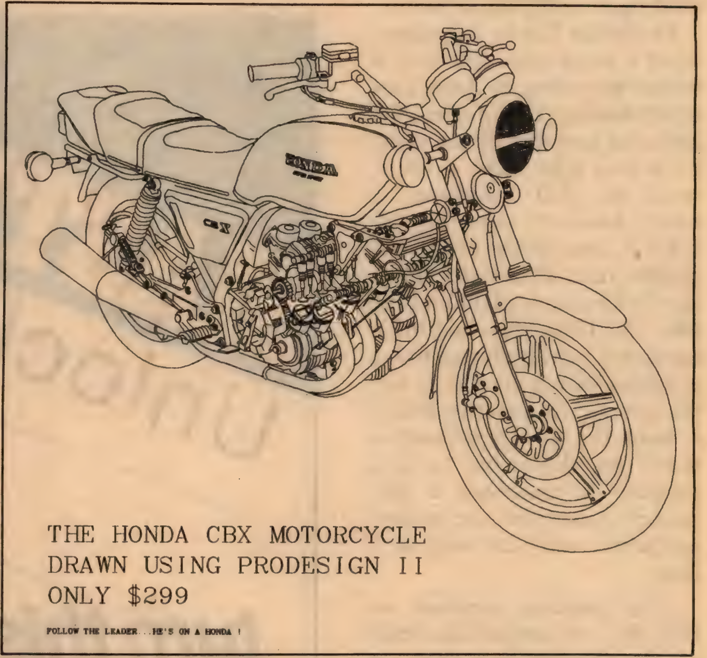
Use of the program at first is cumbersome until you get familiar with the commands. Even using the quick reference card it takes time and you will constantly refer back to the manual. After using the program for awhile the commands will begin to come faster as you commit them to memory. This isn't a $1500 package with pull down menus and the like but it isn't all that hard to use. It is the type of package that you need to use frequently to maintain a proficiency that will allow you to operate the program with ease.

Features available in Prodesign include on screen zoom (+ and −) and rotation, text (you can read a text file from a word processor into your drawing and use it as part of the end product) and color graphic capabilities, Paint, color change, rubber band line and box, screen window movement in 4 directions, Undo command to cover mistakes and an "OOPS" to undo an erasure or deletion. Other features are as expected for loading and saving, drawing commands, auto dimensioning, using X,Y coordinates as well as polar coordinates for point setting, automatic lines of various types and many more features that you would expect in a more expensive package.

Cursor control is through the numeric keypad for normal step by step movement. Using the Control key in combination with 4 number keys will move the cursor to the extremes of the screen. A mouse or digitalizer can also be used. To draw a line is a matter of setting two or more points and using another command to draw the figure. Other drawing commands are just as simple to use. Arcs, Curves, Fillet (rounding off a corner with a

continued on page 146





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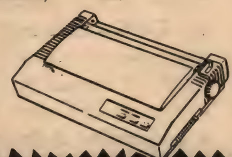

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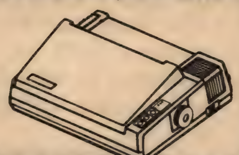

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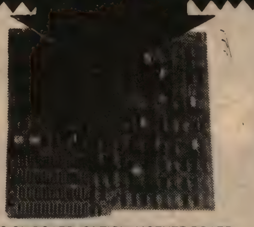

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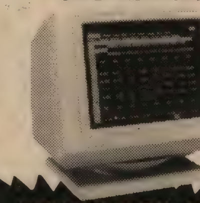

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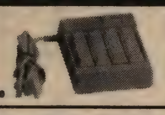

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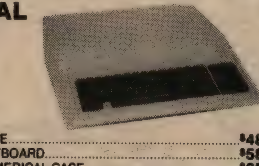

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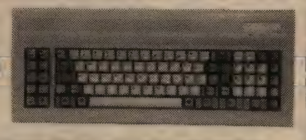

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Prodesign II CAD
continued from page 144

smooth arc), Chamfer, Overlay, Layers, Ovals, Paint and others are single key operations.

Use of the Print feature is a lot easier than I expected. Once the drawing is loaded the size of the drawing is displayed in dimensions (length and width). By selecting the drawing units and rotating the drawing you make it fit your paper size. The program will warn you if the drawing size exceeds your paper. Select the print command and sit back and wait. The quality of the drawings on a dot matrix is astounding! I guarantee you will be pleased with the resolution and clarity. The output from the dot matrix looks like it came from plotter.

The documentation with Prodesign is excellent. All points of the operation are well covered in a well written manual. The last 45 pages describes some of the advanced techniques of the program. I found this section to be the one I used most as I went through the package. The index is better than most that I find in software documentation. The only real complaint I have is the binder as it takes up too much room when it is open on the desk. Someone at ASBC must have felt the same way as they thoughtfully had a couple of extra holes punched in the pages so it would fit a normal binder for 5½x8½ pages instead of the harder to find software binders.

Not being a programmer I probably overlook the difficulty involved in including some features. It would be easier to use Prodesign if some of the features were handled like the Line command (/). A help screen comes up to show the various lines available when you invoke this command. However the Help feature (?) more than adequately covers the areas that will give you any problems. Perhaps a few pull down menus would make operation a little faster when dealing with the mechanics of drawing.

For the price this is an excellent package. Like I said earlier it will take some getting used to before the results will please you. Prodesign isn't as easy to use as some of the packages that cost 3-5 times as much but it is worth a heck of a lot more than its price.

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Maynard Electronics announces SURPRISE 286!, an 80286-based turbo board that increases a PC's speed to virtually that of an AT. SURPRISE 286! is the latest addition to Maynard's SURPRISE! line of turbo boards.

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SURPRISE 286! includes a socket on the board for either a 5 or 8 megahertz version of the 80287 math coprocessor. The card has 8k of cache memory built in. The card measures five by four inches and requires half of an expansion slot.

The SURPRISE! family was designed with hardware and software compatibility in mind. To allow for ultimate software compatibility, SURPRISE 286! is designed to run in three different speeds, turning the cache memory on and off and standard 8088 mode. To ensure ease of use, toggling between speeds is simple. If a user wishes to run in a standard 8088 mode, he simply flips a switch on the back of the card. While in the 286 mode, if a user wishes to toggle between cache memory on and off, he simply types a designated three key sequence. SURPRISE 286! is fully EGA, EMS and DMA compatible.

SURPRISE 286! carries a retail price of $599 and is backed by Maynard's industry-leading five year warranty.

For additional information contact Maynard Electronics, 460 E. Semoran Blvd., Casselberry, FL 32707. ●

Niceprint Hail A New Classic!

by Hal Nieburg

A "classic" is defined as something that creates or defines its class. In the short history of microcomputing, a few pieces of software have deserved to be termed classics. I would mention MS-DOS, the old Wordstar, certainly Lotus 1-2-3, and a very few others. Now I have seen a small wonder which is on its way...

Niceprint is its name. It has that unique quality of winning converts the first time they see it do its thing. Residing in about 30K of memory, it transforms ordinary dot matrix printers into a whole print shop of capabiliites, featuring over a dozen fonts, full control of size and space changes, even sideways printing of spreadsheets! One can with a single command inserted in the text readily prepare documents in which some portions are sideways and others are normal, a mix that is very impressive in reports.

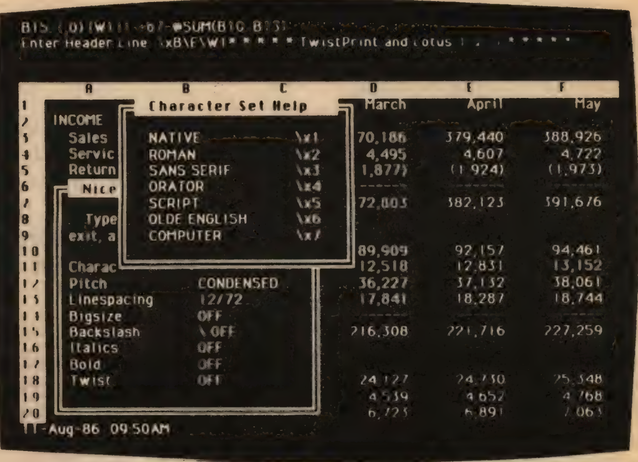
Very nice indeed is this product, fast and easy to use, and maintaining optimum printing speeds for very fancy fonts. It produces something better than so-called "near-letter quality," even for a nine-pin print head; and for a 24-pin system, the result is indistinguishable, by bare eyeball, from the highest quality daisy wheel.

In general, any printer which is compatible with the Epson or IBM Graphics standards will support this software, including IBM graphics, Proprinter, Quietwriter; Epson RX, FX, LQ, SQ, MX; Star Micronics Gemini, Radix, Delta; Panasonic dot matrix, Okidata 92 and 93 and 192, 193; C-Itoh BPI series, Toshiba 351, 341, 321; Canon RW1156A; Diablo P32; Brother M-1509; Smith Corona D200, and TI 850, 855.

The new release provides installation options for wide 132 column printers and permits configurations for other printers not included on the list.

Software Transparency!

Its greatest asset is its 100% software transparency! No modification of software is required; all features of favorite applications adapt at once. In testing, I found no keyboard clashes with active programs (even the notorious XYWRITE), nor with other memory resident utilities (such as Sidekick). Once Niceprint is resident in memory, the user can enter any program, edit and create documents and data; and, when it is time to produce finished hard copy, open a pop-up window on the screen (with Ctrl-Alt, M), which looks like this (on a Lotus 1-2-3 screen):



```
B15: (,0) [W11] +b7-@SUM(B10..B13)
Enter Header Line  \xB\F\W1* * * * * TwistPrint and Lotus
        A              B              C            D           E           F
 1                Character Set Help             March       April         May
 2  INCOME
 3    Sales      NATIVE               \x1       70,186     379,440     388,926
 4    Servic     ROMAN                \x2        4,495       4,607       4,722
 5    Return     SANS SERIF           \x3        1,877)     (1,924)     (1,973)
 6  Nice         ORATOR               \x4       ------      ------      ------
 7               SCRIPT               \x5       72,803     382,123     391,676
 8    Type       OLDE ENGLISH         \x6
 9  exit, a      COMPUTER             \x7
10                                              89,909      92,157      94,461
11  Charac                                      12,518      12,831      13,152
12  Pitch             CONDENSED                 36,227      37,132      38,061
13  Linespacing       12/72                     17,841      18,287      18,744
14  Bigsize           OFF
15  Backslash         \ OFF                    216,308     221,716     227,259
16  Italics           OFF
17  Bold              OFF
18  Twist             OFF                       24,127      24,730      25,348
19                                               4,539       4,652       4,768
20                                               6,723       6,891       7,063
11-Aug-86  09:50AM
```

NicePrint Screen Window
Figure 1

Turn on the printer, make the appropriate selection of printer styles, and accept them (with F10). The window disappears and you are still in the primary software. Now whenever you elect to send data to the printer, the data will print in the styles selected. And those parameters can be changed again, or shut off entirely, just as simply.

It is also possible to activate the program directly from DOS or by command line. For example, at the prompt:

```
A>nice twist
```

will load the program and select sideways printing, in near-letter quality and in choice of fonts. You can increase print speed by selecting from a pop-up menu draft or medium quality instead.

The package contains 15 fonts, including Roman, Sans Serif, Orator Large, Script, Olde English, Science, and IBM graphics characters. Of the latter, Niceprint makes it possible for non-IBM graphics-compatible printers to reproduce the IBM graphics character set! And it makes the IBM Proprinter print italics. In the latest release, small and tiny fonts were added for printing large amounts of sharp clear data on the page. In addition, there are six pitches: standard pica, standard elite, condensed, wide, and double height.

Control of all parameters allows over 300 different combinations. Various embellishments are selectable, including boldface, italics, changes in line spacing, and sideways (called here "twisted"). Note on the window how one can move the pointer to each parameter and select among a group of options.

The user can embed commands in a text or data file. A change in font will occur when the printer encounters

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Latest PC-Write (2.7)—Bob, You Made The Pants Too Long?

by Hal Nieburg

The world's most popular "user-supported" word processor is in a new release, with a built-in 50,000 word spellchecker, and hundreds of new features. Programmer Bob Wallace keeps up the pace of significant upgrades every six months or so, as PCWrite, a paragon of speed and convenience, becomes the fastest growing software on college campuses and business offices everywhere.

As successful programs, like Lotus 1-2-3, dBaseIII, PCWrite, reach maturity, the question inevitably arises: Where do we go from here? There is a tendency not to know when to stop tinkering. Should product enhancements go on forever?

Software publishers are haunted by the spectre of WordStar, which remained largely unchanged during its years of great success, even as the processor chip went from Z80 to 8088. "Loyality to the user" was the reason given for stability, and the payoff was that WordStar slowly died, and even the completely refurbished WS2000 could not regain the lost ground.

To remain competitive in a rapidly moving technology, it is believed that new wrinkles in a product are required at a steady rate, almost in the same way as hemlines and silhouettes change with the season. Often the enchancements are in response to user needs and strengthen the software.

But beware the dangerous tendencies of technological virtuosity. Enhancement to satisfy a programmer's itch, leading to marginal features and much higher complexity, may lead a product into a dead end. After looking at the last two upgrades of PCWrite (2.6 and 2.7), trying them out on dozens of college students, I am led to the conclusion that in some respects Bob Wallace' PCWrite has reached a point of diminishing returns.

Don't get me wrong. It is still a superb program! In fact, for an admirer of programming virtuosity, it is a real model of the art; and, for the advanced user, it remains a better tool than ever. I speak of its potential market among average users, where it may have exceeded its optimum point.

Going two versions back, to Version 2.55 of 18 months ago, we had an excellent middle level word processor. Easy to learn and to use, with nine help screens, and all of the features needed for simple word processing. QuickSoft promised some marginal improvements for later releases, including a spellchecker, automatic footnote re-numbering, larger text buffers, better documentation, tutorials, more windows, column formatting and column block control, etc.

When Version 2.6 appeared about ten months ago, many loyal users were anxious to move up. After trying the new package, most of them (I did not take a survey but my observations are based on several college campuses) went right back to 2.55. Indeed, it is this version, not Version 2.6, that continues to grow in popularity, leaving 2.6 somewhat high and dry. Many first time users who began PCWrite with 2.6, didn't cotton to it and soon moved away to WordPerfect 4.1 (the latter is taking over the place of WordStar in the hearts of academic users).

Many New Features

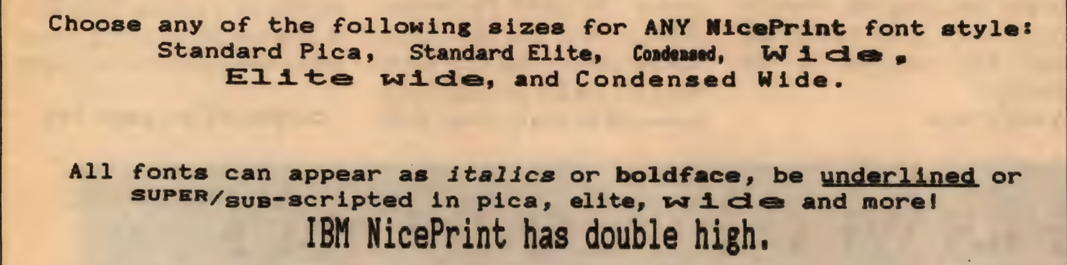
The latest release strives to fulfill all the promises. It is a true opus magnum. True the text buffer size remains the same (about 60K), but users are accustomed to that problem and know how to assemble large manuscripts with consecutive pagination and footnote/endnote numbering. No column manipulations have been added, but even here, users have developed a bank of tricks for accomplishing the same operations, and some alignment tools in the new version are helpful.

But there is now the long-promised speller and a vast number of new features, such as:

—"Screen clip" is a wonderful feature which I want to highlight here for its originality and power. It works somewhat like Borland's Sidekick Notes. It permits the user to exit temporarily from a word processing text to a DOS shell, load another program, bring up a PCWrite menu within that program, mark and transfer any screen from that program into the working word processor file, then return to the original file. Not only text can be moved between programs, but any screen at all, including some graphics. One can use this facility to freeze and copy demonstration

continued on page 150

NicePrint
continued from page 147



Choose any of the following sizes for ANY **NicePrint** font style:
Standard Pica, Standard Elite, Condensed, Wide,
Elite wide, and Condensed Wide.

All fonts can appear as *italics* or **boldface**, be underlined or
SUPER/SUB-scripted in pica, elite, wide and more!

IBM NicePrint has double high.

Figure 2

an embedded backslash followed by a 1 through 7 font code. On the pop-up window, one merely activates the "backslash" mode and . . . Voila! The printer will change fonts and styles within the same document, even on the same line, to the user's delight, viz. the following illustration:

Each installation of Niceprint holds up to six fonts, plus a toggle to the printer's "native" or draft mode. By setting up several different sets of fonts, one can access all 15 fonts.

Spontaneous Applause

I can testify that everyone to whom I have shown this product immediately wants to own a copy. It is obviously a comer and an emerging classic. On its merits alone, it will, I am sure, build a substantial crowd of users and admirers. This small wonder makes a printer sing and dance, astonishing even the original manufacturers.

The program is available also for Apple II, II+, and IIe computers, requiring a special card. The package sells for $139 with six fonts, $159 with 12 fonts, an editor system, and a special RAM chip. It performs hi-res graphic dumps and is fully compatible with Apple-Words, Apple Writer II, and most Apple software.

Niceprint in the current IBM release (version 3.03), was created (in assembly language) by John Spies (rhymes with "ease"), and is available for $95 from Spies Laboratories, PO Box 336, Lawndale, Ca 90260. For telephone orders and/or technical support, call 213/538-8166. John himself might answer. Once you have tried it, you'll never let it go! ●

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The Latest PC-Write

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screens to a PCWrite text file, move material from spreadsheets and databases directly into ASCII files, where it can be edited and formatted like ordinary text!

—Innovations from 2.6 are improved in 2.7, including the capability of drawing fancy boxes on the screen from the ordinary keyboard. Shf-Alt and Sft-Ctl activate key assignments from the extended character set, allowing all kinds of graphic enhancements, including vertical line drawing, single/double or ornamental lines, with fitted intersections of different line types. All the foreign language characters and math symbols of the extended character set can be typed from the regular keyboard (rather than Alt-Num pad) by means of a simple command stroke.

An assisted installation utility, WorkDisk, which allows the most innocent user to set up the program for different hardware configurations.

The status line now displays more editing toggles, including wordwrap on/off, auto-reformat on/off. You can now control wordwrap as well as auto-reformatting.

New top-of-screen menus may be turned on and off also, in addition to the 45 help screens. For example, the Alt Main Menu looks like this:

```
-----------------------------------------------------------------------------
Esc:cancel.  F1-F1:help.  Alt/Shf/Ctl/Arrow:select.  Fn-key/Letter/Enter:action.
aF1:Name/file   aF3:Key-record  aF5:Conversion  aF7.Pagebreaks  aF9:To-location
aF2:Spelling    aF4:Misc-stuff                  aF8.Upper-case  aF10:Replace-all
-----------------------------------------------------------------------------
The printing menu looks like this:
-----------------------------------------------------------------------------
 F1.Help-screen  F3.Finished     F5:Input-end    F7:Repeat-pages F9.Page-stop
 F2.Exit-to-DOS  F4.DOS-command  F6:User-input   F8:Skip-pages   F10.Continuous
-----------------------------------------------------------------------------
```

While printing, a sub-menu comes on with commands for stopping, printing single pages, skipping pages, etc.

A 30-minute save reminder can be embedded in the edit control file.

The program treats as the beginning of a paragraph any line that proceeds subsequent lines at the left margin. The auto-indent feature of 2.6 is gone. This wrinkle permits auto and manual paragraph reformatting, regardless of the starting column of the first line, permitting undents or hanging indents.

Cursor navigation and word-deletion now avoid falling on embedded font characters, reducing the number of keystrokes required when editing copy that is marked for special printing fonts. Similarly, hard and soft hyhens are ignored when deleting words to right or left of cursor.

When deleting in series, it is now possible to append the whole series into a hold buffer, instead of just the last deletion, so that the whole series can be retrieved or moved as a block if you change your mind.

The new conversion menu works directly from keyboard strokes (rather than from the edit default file), allowing on screen conversions of WordStar files, old dot commands, tab characters to spaces, changes in spacing (just/unjust), changing hard/soft breaks, etc. It should be noted that the default space after a sentence is two spaces, rather than a single space. All dot commands now require an Alt-G (the female symbol) at the left margin to keep the computer from treating them as text.

Within a single text file, unlimited changes in block formatting and fonts are now possible. A command writes a customized ruler at the point of change. Talk about fine points of programming, this feature allows the margins to be reckoned on a different CPI

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The Latest PC-Write

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(characters-per-inch) than the text lines.

A single command inserts the date (in any default form desired) at the cursor in any file. Other similar macros can be installed in the edit default file and evoked at any time by the assigned key, on screen.

Both proportional spacing (equal space around characters, no matter the character's size) and micro-justification (equal spaces among words on a right-justified line) are supported in the new package. The latter significantly slows down printing and can be removed by deleting the $H lines in the printer default file (pr.def).

Automatic re-numbering of footnotes (and variables such as special re-pagination, outlines, lists) can be accomplished by embedding a character for the number. On printing, the correct number sequence will be used.

Drivers and keyboards for PC Jr., use of a mouse, most printers (including the newest lasers), are standard.

—And on and on....

Puzzlements

The spelling checker contains the seeds of greatness. It is clear that Bob sought to break with the tired-old patterns and create something truly new. But unfortunately the seeds mainly do not germinate! On hitting Alt-F2, the 50,000 word dictionary is loaded to memory and a spelling menu appears on the top of the screen:

```
--------------------------------------------------------------------------------
Esc F1  F2.Check F3.Guess F4.Add-word F5.Load-list F6.Save-List F7.Auto± Grey±
--------------------------------------------------------------------------------
```

Hitting F2 causes the word at the cursor to be checked. Hitting F7 toggles on automatic checking as each word is typed (a la Borland's Turbo Lightning). The dictionary search algorithm is ambitious. If you select "F3.Guess" the top line shows one suggestion at a time, the Grey + and – keys allowing the user to move forward and backward through document. When the guess appears right, an Enter stroke replaces the word in text.

But the search is not conducted in alphabetical order. Rather it does some funny things. If a match of the first two letters is non-productive, the algorithm tries to match other letters of the misspelled word, and the suggestions can go pretty far afield.

For example, I tried to deliberate misspelling of "list" as "lyst" to see how long it took to come up with the right correction. The first five tries: M, lust, oilseed, lusty, walked. On the 12th try, "lace" seems to be getting in the right ballpark, but no, instead the program explored a bunch of other ideas, arriving at the 24th try at "Lesotho." Then things became more promising as the choice went to "lest" and finally, on the 30th try, success!

I conducted the same experiment with Borland's Lightning, IBM's WordProof and Ashton-Tate's Framework. Lo, each of them went to the right correction on the first cluster of suggestions! Bob, what you are doing is worthy but the algorithm needs some refinement.

The old utility for accessing a disk by sector and moving the contents into an ordinary text file (F1, Sft-F9) is missed. It was an invaluable aid for rescuing data from damaged directories or crashed disks. Those who discovered this handy utility in Version 2.55, I am sure, will never part with it.

Overall Assessment

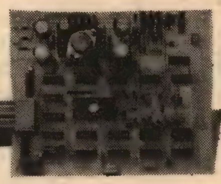
Like earlier versions, 2.7 allows very sophisticated user customization, merely by embedding various ASCII characters into the default parameter files (ED.DEF and PR.DEF). This is a terrific convenience and even a determined average user can learn to do it. It permits changing the keyboard assignments, loading macros at bootup, changing the program functions, etc.

Bob Wallace shows his respect for users in so many lovely ways! Not only does he offer the unmodified product without payment upfront, make eventual payment voluntary, without a single hint of reproach, but he also provides a user key to all the program secrets in the default files! He demonstrates nobility in his regard for the best in human nature. He has said that he doesn't care who uses his software or who pays for it, so long as he receives enough money to finance his efforts. And indeed,

continued on page 152

MS-DOS, CP/M EPROM PROGRAMMING SYSTEM

2708
2758
2716
2516
2532*
2564*
68764*
2816A



2732/A
2764/A
27128/A
27256
27512
27CXXX
2864A
8751UC*

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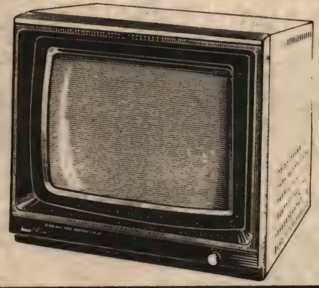

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Carousel! Software to Multiply Memory 10 Times

by Hal Nieburg

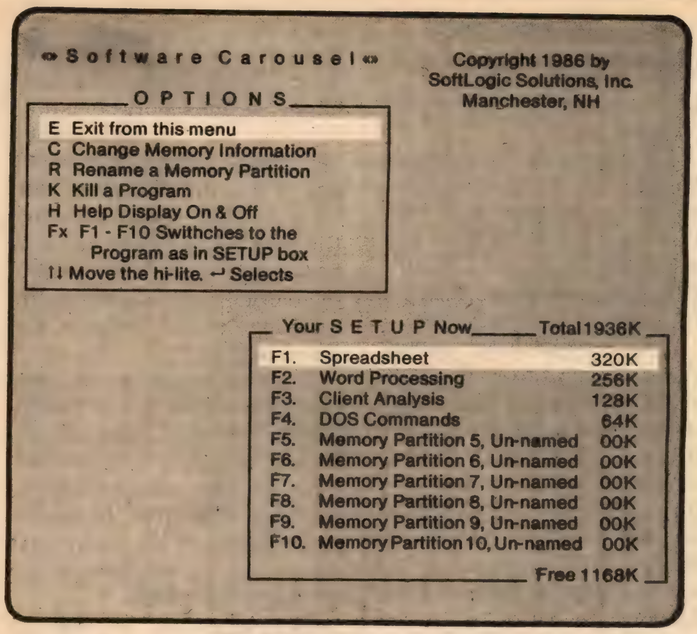
Yes, you can multiply working memory 10 times. In a 640K machine, with a hard disk, it is possible to load programs and data files up to about 5.4M of virtual RAM. Even if your PC has only 256K on the motherboard, and a hard disk, you can command over 2M of working RAM, all at the same time!

Carousel, by SoftLogic Solutions (530 Chestnut St., Manchester, NH 03101, 603-644-5555), is the well-chosen name and it sells for the paltry price of $49.95. Imagine, only $49.95 for over 5M of additional memory. This remarkable new release transforms one computer into many computers, all operating at the same time, from a single keyboard and monitor. Inside that machine, each of the virtual computers can be summoned into life, turning into view like the figures on a carousel.

Or the program may be likened to a slide projector, rotating the separate partitions to the screen as if each were a different 35mm Kodakchrome slide. Each program snaps into place exactly as you left it earlier, in perfect focus with all the data loaded and the cursor flashing, ready to go back to work, where you left off the last time. The program has the additional power to access any of the slides in any random order selected by the user, with the flicks occurring almost instantaneously.

With this program, the company has trumped its earlier product DOUBLEDOS. The latter enabled the user to split memory into two partitions, running two programs at the same time and switching back-and-forth between them; but the whole operation was carried out by dividing RAM between them. In a 512K installation, each program could only address a portion of the whole, and the two buffers together was less than 512K.

On the other hand, Carousel crosses the 640K barrier in grand style, enabling users to create up to 10 partitions, each protected from the others and functioning in complete independence within its own buffer; each program able to address the full memory, without regard for the others, without keyboard clashes, without impairing the CPU operating speed.



```
«» S o f t w a r e   C a r o u s e l «»        Copyright 1986 by
                                           SoftLogic Solutions, Inc.
           O P T I O N S                        Manchester, NH
  E  Exit from this menu
  C  Change Memory Information
  R  Rename a Memory Partition
  K  Kill a Program
  H  Help Display On & Off
  Fx  F1 - F10 Swithches to the
        Program as in SETUP box
  ↑↓ Move the hi-lite. ↵ Selects

                    Your S E T U P Now_______Total1936K
                    F1.   Spreadsheet                       320K
                    F2.   Word Processing                   256K
                    F3.   Client Analysis                   128K
                    F4.   DOS Commands                       64K
                    F5.   Memory Partition 5, Un-named      00K
                    F6.   Memory Partition 6, Un-named      00K
                    F7.   Memory Partition 7, Un-named      00K
                    F8.   Memory Partition 8, Un-named      00K
                    F9.   Memory Partition 9, Un-named      00K
                    F10.  Memory Partition 10, Un-named     00K
                                                    Free 1168K
```

The Software Carousel Menu

There are Limitations

There are certain things Carousel cannot do. Software written under the LIM (Lotus/Intel/Microsoft) or the EMS (Extended Memory Specification) specifications (on both 8088 and the 80286 CPUs) make it possible to address memory above 640K, making it possible to load very large working files and data (such as spreadsheets in the megabyte range) into RAM on PCs and ATs. However, under Carousel, the extra memory is used in a different way. For that reason, Carousel will not be useful for people who need,

continued on page 154

The Latest PC Write

continued from page 151

expect the best and receive the best!

And up to now, it has worked for him! It restores one's faith in people and one would like to see it keep on working.

45, repeat 45, help screens! Version 2.6 had many new features, but the giveaway was the new battery of help screens. Didn't Bob realize that 45 help screens are too many? That there is something wrong with a program that requires 45 help screens? True, the help facilities of earlier versions were a bit cluttered and confusing; but there was rigor and clarity in the logic of the command structure and new uses soon were able to interpret the reminders available at the beck of F1.

Version 2.7 and its predecessor, are so full of new menus, all kinds of new key combinations, rococo ornamentation, chrome doodads, and outlandish tailfins, that longtime loyalists are hauling out their old 2.55s.

It can be seen that 2.7 is a programmer's piece d'resistence. But it may be too complicated and heavy for the average user, and may be avoided for that reason. It may become in fact a museum specimen of virtuosity for its own sake. With all of its fine and novel powers, it may end up of interest only to advanced users and fanciers of incunabula. That is unfortunate both for users and for the program itself.

In Version 2.8 (or even better 3.0), Bob Wallace should undertake to find a new middle way between 2.55 and 2.7, improving the speller and changing the text buffer size, while retaining the best features of the later release. Otherwise I fear PCWrite will fail to win converts among the great majority of potential users, and I hate to see that happen!

The program is available on two disks for cost ($16, including shipping) from QuickSoft, 219 First N. #224, Seattle, WA 98109; 206-282-0452. Only a quick summary of the documentation is supplied on disk. The complete hardbound documentation can be purchased separately $45, softbound $35, with volume discounts and sit licensing available. Registration is $89, and includes the hardbound copy, full telephone support, bulletins, and special rates for future upgrades. ●

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INT.EXE-Listing Your Interrupt Vectors

continued from page 142

```
/*****************************************************************************/
/***                                                                      ***/
/***       A UTILITY PROGRAM TO PROVIDE INTERRUPT VECTOR LISTINGS         ***/
/***           ALSO LOCATES OPTIONAL ROMS INSTALLED IN SYSTEM             ***/
/***                                                                      ***/
/*****************************************************************************/

#include (string.h)
#include (stdlib.h)

struct vector {                         /* global structure to store vectors */
  unsigned int seg;
  unsigned int off;
} interrupt[256];                       /* global array of actual vectors    */

/*****************************************************************************/

main(argc,argv)
int argc;
char *argv[];
{
  int num,trgt1,trgt2;
  unsigned int far *ptr;                /* far pointer used to "peek" memory */
  void listgrp(),listall();             /* void function declarations        */

  for(num=0; num (= 255; num++) {       /* begin by reading in all vectors   */
    ptr = num * 4;
    interrupt[num].seg = *(ptr+1);
    interrupt[num].off = *ptr;
  }
  if (argc == 1)                        /* if no args, list all vectors      */
    listall();
  else if (argc == 2) {                 /* need either help or one vector    */
    if ((! strcmpi(argv[1],"help"))||(! strcmpi(argv[1],"?"))) {
      puts("\nINTERRUPT - Copyright 1986 by Andrew M. Fried\n");
      puts("Available Commands :\n");
      puts("\"INT\"                     print listing of all interrupt vectors to STDOUT.");
      puts("\"INT n\"                   display single vector (n=decimal).");
      puts("\"INT n n\"                 display range of vectors (n=decimal).");
      puts("\"INT ?\" or \"INT help\"     print out this help listing.");
      puts("\nNOTE: You may use the DOS \")\" command to redirect program output.");
    }
    else {
      trgt1 = atoi(argv[1]);
      listgrp(trgt1,trgt1);
    }
  }
  else if (argc == 3) {
    trgt1 = atoi(argv[1]);
    trgt2 = atoi(argv[2]);
    listgrp(trgt1,trgt2);
  }
}

/*****************************************************************************/

void listall()                          /* produces full vector listing      */
{
  int num,r1,r2,r3;

  puts("        INTERRUPT VECTOR LISTING UTILITY for IBM PC and MS-DOS Compatibles");
  puts("                        (c) 1986 by Andrew M. Fried\n");
  for(num=0; num ( 85; num++) {
    r1 = num * 3;
    r2 = r1 + 1;
    r3 = r2 + 1;
    printf("%03d [0x%02X] %04X:%04X        %03d [0x%02X] %04X:%04X        %03d [0x%02X] %04X:%04X\n",
      r1,r1,interrupt[r1].seg,interrupt[r1].off,
      r2,r2,interrupt[r2].seg,interrupt[r2].off,
      r3,r3,interrupt[r3].seg,interrupt[r3].off);
  }
  printf("%s%03d [0x%02X] %04X:%04X\n",
    "                              ",
    255,255,interrupt[255].seg,interrupt[255].off);
  romcheck();                           /* locate any rom signatures         */
}

/*****************************************************************************/

void listgrp(start,stop)
int start,stop;
{
  int loop;

  puts("\nINTERRUPT - Copyright 1986 by Andrew M. Fried\n");
  if ((start(0)||(stop)255)||(start)stop))
    puts("Vector out of range! Program aborted...\n");
  else
    for(loop=start; loop(=stop; loop++)
      printf("%03d [0x%02X] %04X:%04X\n",loop,loop,interrupt[loop].seg,interrupt[loop].off);
}

/*****************************************************************************/

romcheck()
{
  int count = 0;
  unsigned long memloc;
  unsigned int far *ptr;

  for (memloc=0xC8000000; memloc (= 0xF4000000; memloc+=0x800000) {
    ptr=memloc;
    if (*ptr==0xAA55) {
      count++;
      printf("\nROM Bios Signature found at %04lX:%04lX...\n",memloc))16,memloc&0xFFFF);
    }
  }
  if (count == 0)
    puts("\nNo ROM BIOS signatures found in memory from C800:0000 to F400:0000.\n");
  else
    printf("\nROMCHECK located a total of %d ROM signature(s).\n",count);
  return(count);
}

/*****************************************************************************/
```

```
INTERRUPT - Copyright 1986 by Andrew M. Fried

010 [0x0A] 0070:0325
011 [0x0B] 0070:039F
012 [0x0C] 0070:0419
013 [0x0D] 0070:0493
014 [0x0E] 0070:050D
015 [0x0F] 0070:0C67
```

The above examples shows the output produced when a range of interrupts is requested.

```
        INTERRUPT VECTOR LISTING UTILITY for IBM PC and MS-DOS Compatibles
                        (c) 1986 by Andrew M. Fried

000 [0x00] 21DB:0354        001 [0x01] 0070:0C67        002 [0x02] 0070:01A6
003 [0x03] 0070:0C67        004 [0x04] 0070:0C67        005 [0x05] F000:FF54
006 [0x06] F000:837B        007 [0x07] F000:837B        008 [0x08] 11F0:08EB
009 [0x09] 11F0:0A7C        010 [0x0A] 0070:0325        011 [0x0B] 0070:039F
012 [0x0C] 0070:0419        013 [0x0D] 0070:0493        014 [0x0E] 0070:050D
015 [0x0F] 0070:0C67        016 [0x10] 11F0:0FDF        017 [0x11] F000:F84D
018 [0x12] F000:F841        019 [0x13] 11F0:0A08        020 [0x14] F000:E739
021 [0x15] F000:F859        022 [0x16] 11F0:0AA3        023 [0x17] F000:EFD2
024 [0x18] F000:858F        025 [0x19] 09A5:008E        026 [0x1A] F000:FE6E
027 [0x1B] 0070:0C61        028 [0x1C] 11F0:08C4        029 [0x1D] F000:F0A4
030 [0x1E] 0000:0522        031 [0x1F] F000:0000        032 [0x20] 02C1:136C
033 [0x21] 11F0:0D87        034 [0x22] 10DF:012F        035 [0x23] 10DF:013C
036 [0x24] 10DF:04EB        037 [0x25] 11F0:0DBE        038 [0x26] 11F0:0DD4
039 [0x27] 02C1:5DFE        040 [0x28] 11F0:09E3        041 [0x29] 0070:017A
042 [0x2A] 02C1:1372        043 [0x2B] 02C1:1372        044 [0x2C] 02C1:1372
045 [0x2D] 02C1:1372        046 [0x2E] 10DF:0257        047 [0x2F] 0070:1EBD
048 [0x30] C113:73EA        049 [0x31] 02C1:1302        050 [0x32] 02C1:1372
051 [0x33] 02C1:1372        052 [0x34] 02C1:1372        053 [0x35] 02C1:1372
054 [0x36] 02C1:1372        055 [0x37] 02C1:1372        056 [0x38] 02C1:1372
057 [0x39] 02C1:1372        058 [0x3A] 02C1:1372        059 [0x3B] 02C1:1372
060 [0x3C] 02C1:1372        061 [0x3D] 02C1:1372        062 [0x3E] 02C1:1372
063 [0x3F] 02C1:1372        064 [0x40] F000:EC59        065 [0x41] F000:E471
066 [0x42] F000:837B        067 [0x43] F000:837B        068 [0x44] F000:837B
069 [0x45] F000:837B        070 [0x46] F000:E401        071 [0x47] F000:837B
072 [0x48] F000:837B        073 [0x49] F000:837B        074 [0x4A] F000:837B
075 [0x4B] F000:837B        076 [0x4C] F000:837B        077 [0x4D] F000:837B
078 [0x4E] F000:837B        079 [0x4F] F000:837B        080 [0x50] F000:837B
081 [0x51] F000:837B        082 [0x52] F000:837B        083 [0x53] F000:837B
084 [0x54] F000:837B        085 [0x55] F000:837B        086 [0x56] F000:837B
087 [0x57] F000:837B        088 [0x58] F000:837B        089 [0x59] F000:837B
090 [0x5A] F000:837B        091 [0x5B] F000:837B        092 [0x5C] F000:837B
093 [0x5D] F000:837B        094 [0x5E] F000:837B        095 [0x5F] F000:837B
096 [0x60] 0070:02A6        097 [0x61] F000:F065        098 [0x62] F000:FF53
099 [0x63] 0000:0000        100 [0x64] 0000:0000        101 [0x65] 0000:0000
102 [0x66] 0000:0000        103 [0x67] 0000:0000        104 [0x68] F000:837B
105 [0x69] F000:837B        106 [0x6A] F000:837B        107 [0x6B] F000:837B
108 [0x6C] F000:837B        109 [0x6D] F000:837B        110 [0x6E] F000:837B
111 [0x6F] F000:837B        112 [0x70] 0070:0587        113 [0x71] F000:8573
114 [0x72] 0070:0601        115 [0x73] 0070:067B        116 [0x74] 0070:06F5
117 [0x75] F000:857C        118 [0x76] 0070:07E9        119 [0x77] 0070:0863
120 [0x78] 0000:0000        121 [0x79] 0000:0000        122 [0x7A] 0000:0000
123 [0x7B] 0000:0000        124 [0x7C] 0000:0000        125 [0x7D] 0000:0000
126 [0x7E] 0000:0000        127 [0x7F] 0000:0000        128 [0x80] 0000:0000
129 [0x81] 0000:0000        130 [0x82] 0000:0000        131 [0x83] 0000:0000
132 [0x84] 0000:0000        133 [0x85] 0000:0000        134 [0x86] 0000:0000
135 [0x87] 0000:0000        136 [0x88] 0000:0000        137 [0x89] 0000:0000
138 [0x8A] 0000:0000        139 [0x8B] 0000:0000        140 [0x8C] 0000:0000
141 [0x8D] 0000:0000        142 [0x8E] 0000:0000        143 [0x8F] 0000:0000
144 [0x90] 0000:0000        145 [0x91] 0000:0000        146 [0x92] 0000:0000
147 [0x93] 0000:0000        148 [0x94] 0000:0000        149 [0x95] 0000:0000
150 [0x96] 0000:0000        151 [0x97] 0000:0000        152 [0x98] 0000:0000
153 [0x99] 0000:0000        154 [0x9A] 0000:0000        155 [0x9B] 0000:0000
156 [0x9C] 0000:0000        157 [0x9D] 0000:0000        158 [0x9E] 0000:0000
159 [0x9F] 0000:0000        160 [0xA0] 0000:0000        161 [0xA1] 0000:0000
162 [0xA2] 0000:0000        163 [0xA3] 0000:0000        164 [0xA4] 0000:0000
165 [0xA5] 0000:0000        166 [0xA6] 0000:0000        167 [0xA7] 0000:0000
168 [0xA8] 0000:0000        169 [0xA9] 0000:0000        170 [0xAA] 0000:0000
171 [0xAB] 0000:0000        172 [0xAC] 0000:0000        173 [0xAD] 0000:0000
174 [0xAE] 0000:0000        175 [0xAF] 0000:0000        176 [0xB0] 0000:0000
177 [0xB1] 0000:0000        178 [0xB2] 0000:0000        179 [0xB3] 0000:0000
180 [0xB4] 0000:0000        181 [0xB5] 0000:0000        182 [0xB6] 0000:0000
```

Program continued on page 154

Program continued from page 153

```
183 [0xB7] 0000:0000     184 [0xB8] 0000:0000     185 [0xB9] 0000:0000
186 [0xBA] 0000:0000     187 [0xBB] 0000:0000     188 [0xBC] 0000:0000
189 [0xBD] 0000:0000     190 [0xBE] 0000:0000     191 [0xBF] 0000:0000
192 [0xC0] 0000:0000     193 [0xC1] 0000:0000     194 [0xC2] 0000:0000
195 [0xC3] 0000:0000     196 [0xC4] 0000:0000     197 [0xC5] 0000:0000
198 [0xC6] 0000:0000     199 [0xC7] 0000:0000     200 [0xC8] 0000:0000
201 [0xC9] 0000:0000     202 [0xCA] 0000:0000     203 [0xCB] 0000:0000
204 [0xCC] 0000:0000     205 [0xCD] 0000:0000     206 [0xCE] 0000:0000
207 [0xCF] 0000:0000     208 [0xD0] 0000:0000     209 [0xD1] 0000:0000
210 [0xD2] 0000:0000     211 [0xD3] 0000:0000     212 [0xD4] 0000:0000
213 [0xD5] 0000:0000     214 [0xD6] 0000:0000     215 [0xD7] 0000:0000
216 [0xD8] 0000:0000     217 [0xD9] 0000:0000     218 [0xDA] 0000:0000
219 [0xDB] 0000:0000     220 [0xDC] 0000:0000     221 [0xDD] 0000:0000
222 [0xDE] 0000:0000     223 [0xDF] 0000:0000     224 [0xE0] 0000:0000
225 [0xE1] 0000:0000     226 [0xE2] 0000:0000     227 [0xE3] 0000:0000
228 [0xE4] 0000:0000     229 [0xE5] 0000:0000     230 [0xE6] 0000:0000
231 [0xE7] 0000:0000     232 [0xE8] 0000:0000     233 [0xE9] 0000:0000
234 [0xEA] 0000:0000     235 [0xEB] 0000:0000     236 [0xEC] 0000:0000
237 [0xED] 0000:0000     238 [0xEE] 0000:0000     239 [0xEF] 0000:0000
240 [0xF0] A454:A454     241 [0xF1] F000:8449     242 [0xF2] 9000:0046
243 [0xF3] F000:A4AB     244 [0xF4] A2D3:A4D5     245 [0xF5] 0000:0200
246 [0xF6] 0000:9987     247 [0xF7] 0001:0120     248 [0xF8] 80C5:0000
249 [0xF9] 7C00:0000     250 [0xFA] 0080:0001     251 [0xFB] 0000:0001
252 [0xFC] 0003:0000     253 [0xFD] F000:84F7     254 [0xFE] 9100:0246
                         255 [0xFF] 0246:F000

No ROM BIOS signatures found in memory from C800:0000 to F400:0000.
[ This is a sample of the output from INT.EXE ]
```

Carousel continued from page 152

within a single program, to load very large programs or data files (such as very large spreadsheets)!

While up to 10 memory partitions can be created with Carousel and can operate side-by-side comfortably, each of the working areas must be within the 640K limit. There is no capability for cross-partition operations. Data cannot be inserted from a program operating in one buffer into another operating in a second. Even programs like SideKick (able under the Notes extension to import/export data from active screens) cannot cross the borders of partitions, and will only operate within the buffer into which it is loaded. (Indeed, it must be loaded more than once if used in more than one buffer.)

All that extended or expanded memory does is accelerate Carousel's speed. The utility works by rotating the maximum "ordinary" (or low) DOS memory among all the partitions, either by swapping the inactive facets (in all or in part) to the extra memory or to hard disk, or to both. Therefore, the presence of extended or expanded memory make the dumping of different partitions into low memory instantaneous; while use of a hard disk for the same function takes a little longer as each partition's data is read back into the working DOS portion of RAM.

For example, one can load all the chapters of a large manuscript simultaneously into memory. This is done by loading the same word processor into multiple partitions and then filling each partition's leftover RAM with different text files, for, let us say, a total of 5MB of combined material. Then one can spin the carousel from partition to partition, editing any of the chapters on the screen.

If the word processor has multiple windowing features (like XYWRITE III, or Framework), then within each partition it is possible to cross edit, to move blocks among the chapters, etc. But it is not possible to do this between partitions.

Carousel does NOT do multitasking! Whenever the user toggles to a new partition, the previously active program stops in its tracks and waits. It does not come back to life until the machine is toggled back to the same partition. Then, it resumes its task exactly as if there had been no interruption.

Tests I conducted showed that this routine worked well on formatting and copying floppies and on recalculating a spreadsheet. But it failed when I deliberately toggled to a new buffer while an active program was writing to disk. In this respect, there is little to be gained in any case by toggling during mid-task; so I would recommend that switches be made normally when a program is at a hold point.

One Into Many

Lack of multitasking and cross-editing features does not undermine the usefulness of the facility. All is not lost because by a flick of the keys, one can switch partitions. This can be useful in its own right for two reasons:

1.) It enables the user to consult data instantly, moving back and forth among a very large selection of chapters (or spreadsheets). 2.) It enables all of the work-in-progress (under the same or a variety of programs) to be active at a single work station during the entire day, without constant saving and reloading. 3.) It enables one computer to do the work for many.

These are extremely valuable functions. For example, let us imagine how it might be used in a typical business setting. The company has an AT with a 30-Meg hard disk and only 640K of ordinary memory. During every business day, it is customary to run three or four programs on-and-off all day: Lotus 123 for planning data, Lotus 123 for

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Carousel
continued from page 154

sales, dBase III for warehouse management, and a word processor. In addition, Sidekick and DOS utilities are used from time-to-time.

After booting the AT and loading Carousel, about 560K RAM remains. We decided after experimenting with our needs, that six partitions work well for us; so we decided to multiply that 560K by 6 for a total working memory of 3.36MB. When we first boot the program, we are prompted to record these options, and to save them in an OPT file for future automatic loading.

As we gain familiarity with our needs, we might place the Carousel command in the AUTOEXEC.BAT file, to automat the system.

A menu-driven setup is easy to use for the initial installation. It can also be used during an ordinary work session to check on or change the status of the partitions. This is the master menu.

At the start of each working day, the AT operator boots the machine. Starting with partition 1, the spreadsheet for planning is loaded. Then, the machine is toggled to partition 2, and the same program is loaded a second time to keep track of sales. On the partition 3, and the database; then to 4 and the word processor, 5 and Sidekick (SK), and 6 for DOS.

The last two are optional, because the SK could in fact be loaded along with other applications in any of the partitions; and, by exiting temporarily to the DOS shell, which most programs now allow, one could handle DOS chores within other program partitions. So SK and DOS could be handled either way; but using separate partitions simplifies the procedure for office staff, since all functions can be toggled in exactly the same manner and LO! There is SK or DOS on the screen and ready to go when the user gets there.

Details of operations are well thought out at every point. For example, within each partition, the DOS prompt can contain a partition name and a reminder of the amount of RAM available.

In the course of a working day, all six partitions remain active simultaneously, each addressing the full 550K of memory. Users can leave the data files loaded and on the screen, the cursors blinking quietly in place for the next entry. Toggling directly to any of the six programs is accomplished by holding down the HOT KEY and hitting function keys 1 through 6. With no expanded memory on board, the AT maintains the total of 3.36M memory by swapping 550K pages from the hard disk to actual RAM. The transition from buffer to buffer requires a quick scan which on the AT takes only 2.6 seconds. (With enough expanded memory, it becomes virtually instantaneous.)

One micro-computer becomes six separate stand-by computers, each instantly ready to go to work. This is a capability and a convenience not to be despised. In fact, there is something very wonderful about a $49 piece of software able to multiply the number of micros by a factor of 10! No need, whenever one wishes to start a new application, continuously to save the files, exit from a program, load a new program and new files. A flick of a switch and one is already up to speed in any program!

SoftLogic offers a variation on the "copy protection" conundrum. At purchase, the software comes on a protected disk which allows up to three installs (or uninstalls)—to either floppy or hard disk. That in itself is generous; but in addition, a user can acquire a FREE unprotected copy by signing an enclosed form which constitutes a "one license-one PC" agreement.

To sum up, Carousel is an innovative and powerful idea, well-implemented, easy to use, and reasonably priced. ●

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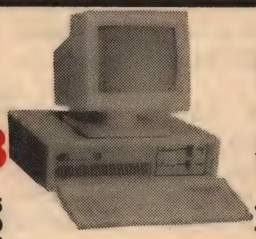

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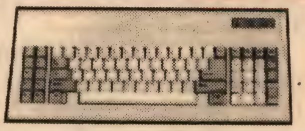

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Megatel's Quark: PC On A Half Shell

by Peter Ruber

The Quark/PC belongs to a breed known as the industrial computer. People who have always worked with canned systems tend to regard industrial computers with a slight sneer. And lest you be of this frame of mind, bear in mind, that by 1990, the industrial computer market will have grown to nearly $2-billion in annual sales.

Industrial computers are single board systems, usually with all peripheral control and I/O ports crammed into an area sometimes as small as the size of a 5.25-inch floppy's surface dimensions. They are designed to control remote devices, or to act as slaves to desktop units, maintaining a sense of order between the work stations and hard disk drives, printers or telecommunications devices.

The miniaturization of these single board computers has been pioneered by Ampro Computers, whose Little Boards have been the basis of several *Computer Shopper* articles. Their success in the market has resulted in a sizable following among serious computerists who wish to convert 8-bit systems into PC-DOS compatible machines, or to create their own systems in configurations that are not only more powerful than their desktop counterparts, but are able to also draw on a vast library of superb MS-DOS and PC-DOS software.

I admit that I have developed more than a mere fascination with these little computers. They're sprawled over my desks like a dozen windchimes. They're not always exact replicas of the PC standard. They have features and abilities that are often unique, and thus seem to provide endless inspiration for articles and application projects. The reason is that PC computers have become a commodity item. They're as common as the housefly, and writing about them has become a bore. The only escape from the mundane are the new Apple, Atari and Commodore systems—and, of course, single board computers.

The only serious competition that Ampro's Little Boards have is from the Quark/PC. Megatel is based in Weston, Ontario, and they have been producing single board computers for several years. The original Quarks were CP/M systems that were quite weighty. Some had big chunks of RAM and color capability, and were used as graphic servers in TV station facilities.

I'm not certain why Megatel chose the name "Quark." Perhaps it was chosen for its unique sound, as though it may have been a creation in a tale by Lewis Carroll. However, if you're inclined to seek out the meaning and origin of unusual words, you will be amused by the contrasting descriptions offered by the Oxford and American Heritage dictionaries.

My quest for the Quark began about six months ago. I had high expectations about it. When it ultimately arrived, after many promises and delays, I viewed it with mixed emotions. But after working with it for a while, my feelings have warmed up a bit.

What's In The Quark

The Quark/PC is a miniature IBM compatible computer inside an area measuring 5.75"x8.50". Every major component that you are likely to find on a standard PC motherboard (the 8088 CPU, the 8237 DMA, the twin 8250 I/O Controllers, the NEC 765 Floppy Controller, the 8253 Counter/Timer, the 6845 CRT Controller) are there. A good portion of the TTL logic chips have been replaced by 13 custom PAL chips. My board had 512K RAM, a battery-backed Real Time Clock, a 10-MHz version of the microprocessor so that you have a board that can really zip along when it has to.

By all considerations, though, the design concept is rather ordinary. There are 70 ICs on the board and nearly a hundred passive components, plus connectors and sockets that provide the means for interfacing to your peripherals and to the outside world. The cost of my board was $715, which is a pricely sum when you can almost buy an assembled "clone" with CRT and floppies for this sum.

What irked me a bit about the design concept is that the Quark/PC is a two-layer rather than a four-layer design, which is almost mandatory when you're trying to cram so many components into so little space. A two-layer design calls for ground and power planes on the perimeters of the top and bottom board layers. This steals valuable space and requires many additional circuit traces. In the case of the Quark/PC, space is at such a premium that only the 8088 CPU, the 8237 DMA Controller, a programmable I/O PROM and the Vano Associates ROM BIOS are socketed. All other chips, including the 256K DRAMs are soldered to the board. While quality control of integrated circuits is highly reliable, I do like to have the major component ICs in sockets.

If Megatel had produced a four-layer board, they could have placed the ground and power planes on inside layers. This would have opened the layout of the board a bit and permitted additional IC socketing, because the ground and power pin connections could have been made by tag-ins at the holes where the pins are inserted.

But it doesn't take up desk space. Mount it on a pair of floppies in a drive case in a corner; run a cable to your TTL Monochrome or RGB monitor, and connect a standard PC keyboard, and you have an unobtrusive system.

Since the Quark/PC is a total emulation of the PC hardware and software standard, it has some of the peculiarities of this standard. Connecting floppies is a typical example. PC floppies are not jumpered in a Device Select fashion. Both floppies are set for DS1. The connecting ribbon cable is used to select drives by a method called Multiplexing. That means the cable is slit so that lines 10 through 16 are separated and then flipped over in order to provide a device select signal for the second drive. Radio Shack used a similar method by removing the teeth from inside the edge card connectors so that each drive on a circuit would only be exposed to those device select signals specific to that drive. This is an irksome pro-

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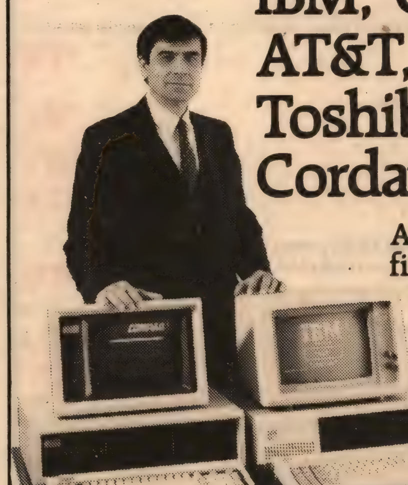

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cedure at best, and I would recommend that anyone considering the Quark as a computing tool should go out and purchase a standard IBM compatible floppy drive cable, and save himself a lot of headaches. If you don't line up all the ribbon cable wires inside the crimp on socket, the drives won't operate.

Expanding The Quark

Where the Ampro 186 PC-DOS has a built-in SCSI interface for hard disk drives, tape systems and external devices, this is an option on the Quark/PC costing an additional $175. The only built-in expansion port for controlling external devices is an Intel iSBX socket, into which you can insert only one remote device. You can, of course, build a wire-wrap expansion board that incorporates several iSBX sockets. Megatel has included additional control lines for decoding the I/O ports for several iSBX devices; but this is a complicated way to go, especially since industrial computer boards should provide a convenient method of accessing external devices.

Megatel's SCSI interface uses the NCR 5380 SCSI Protocol Controller. It is a small daughter board that plugs into the iSBX socket. Since the standard IBM ROM BIOS does not support a hard disk boot code, Megatel includes a new ROM that does. At the moment, it only supports the Seagate 225n 20-MB drive which incorporates the Adaptec SCSI chip set on the drive's logic board. This eliminates the need for a separate hard disk controller board, but it restricts the size of the hard disk.

Unfortunately, while I would have liked to have included some remarks on the SCSI interface based on personal testing, I was unable to obtain a board to work with. I was continually promised one, but after two months of waiting, I decided not to waste any more time. As it was, I had to wait six months for my Quark/PC, and I almost decided not to work with it. However, personal curiosity, and the hope that I might be missing out on something, kept me from straying.

There is another expansion option available on the Quark/PC. It is an IBM compatible bus with two expansion sockets costing $150. This is also a small daughter board that rests over the other half of the board, adjacent to the SCSI board. In order to mate it to the motherboard, you have to remove the CPU and DMA chips. The expansion board then plugs into these sockets, as well as a 9-pin header on the board, so that the two expansion slots (and a socket for an 8087 Math co-processor) have all the signal lines they require.

One of the expansion slots can use a standard IBM compatible hard disk controller card which incorporates the hard disk boot code. This will give you a choice of the type of controller card and size of hard disk best suited to your budget and your needs. Of course, once you plug in both expansion cards, you no longer have access to the iSBX socket, which rather defeats the original purpose of this board.

This expansion board was also not available, even though it was promised for June, 1986, along with the SCSI board. And since it's now the middle of October, I have given up and resorted to calling one of Megatel's engineers for the information I needed to complete this article.

Documentation

The slim 30-page manual I received was crammed between two sheets of plastic and a spine clamp that kept the sheets from straying. You are provided with a chart of the PC's main memory map, some details on how the I/O ports are accesed through the board's components, and pinouts on all the headers so that you can prepare your cables and connectors.

I also received an application note that showed how I could construct an IBM expansion channel through the

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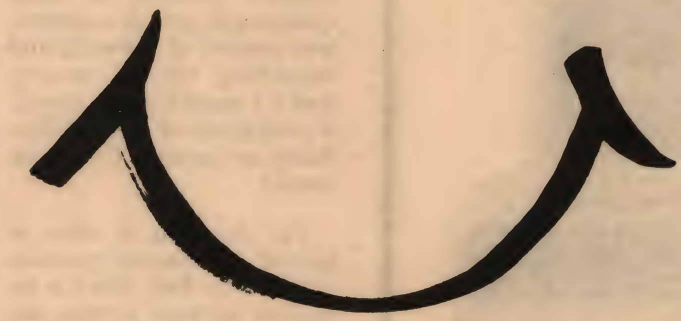

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limited signal lines provided on the iSBX connector. This would allow me to plug in an IBM-XT compatible hard disk controller card. However, since the card doesn't have access to all the control lines it requires, the Quark/PC is unable to communicate with the hard disk Option ROM on the controller. The only way around this dilemna is to burn a new EPROM containing the Vano system BIOS and the hard disk Option ROM. This is obviously not the best way to go, unless you are an experienced hacker; but until Megatel gets around to releasing the expansion daughter boards, you don't have much choice.

A second set of application notes consists of three pages of hand-drawn schematics showing how to create a complete 62-pin expansion port. This is even more complicated, because you have to remount the CPU and DMA chips on a project board and do a lot of point to point wiring. A couple of buffers are also needed to avoid signal degradation. This is a kind of throw-back to the dark ages of computer projects.

What irked me most about the documentation is that everything seems to run together in a way that it gives you the impression that they wanted to save on paper. There are no parts lists or even a schematic. A layout of the board is provided, which is a copy of the board's component side silk screen mask. Unfortunately, none of the IC's, components or headers and sockets are identified. If you wish to locate a component, you have to look at the board itself, or hunt for its identification in the manual.

When you spend this much money on a board, it behooves the manufacturer to provide complete documentation on his product. This is especially important if your product is designed for the industrial market as an instrument for controlling devices.

Conclusion

The Quark/PC is manufactured in Canada. The board's construction is first rate. You can generally spot a cheap product by a low-grade PC board. The Quark is rugged and will probably provide years of problem free service.

In actual usage, it behaved like an IBM-PC should. I used an RGB color monitor and a Monochrome monitor for the output. Composite output is not provided. However, you can ask the factory to install a two-pin header as an option. Or it is simple enough to do yourself, if you're careful, by removing the solder from two holes in the PCB and installing a header.

The big question I formed in my own mind after working with the Quark/PC was WHY? Was I expecting too much? I don't think so. I've spent over a year now working with a variety of single board industrial computers, and the primary purpose of these systems is to provide a convenient method of accessing and controlling external devices. And if a board is worth its salt, it should provide a lot of flexibility for the user. The Quark doesn't.

The expansion it offers is limited. The documentation is inadequate. And, there is no support software to take advantage of special features. If there were special features we might have had an interesting product. This is computing on a half shell. Perhaps Megatel will provide the top half of the shell in the future and give us something to "byte" into. ●

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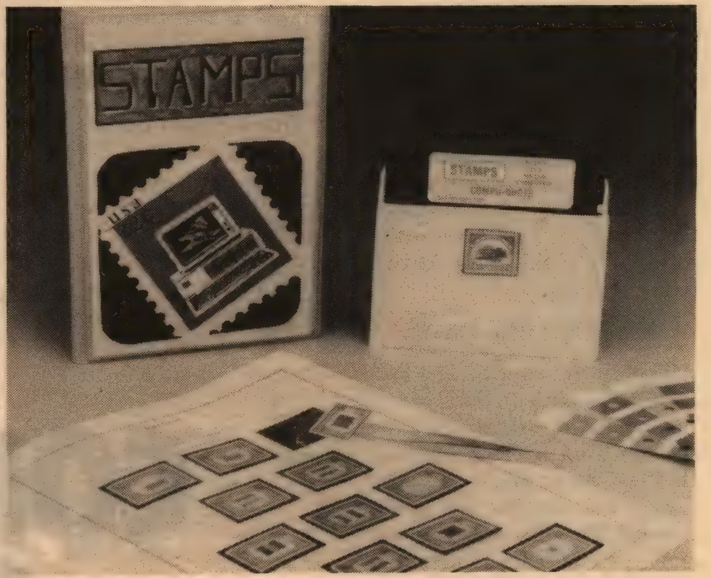

Reviewed by Lon Andrews

Stamp collecting with the help of the PC? Why not? Simple record keeping makes any collecting hobby much more viable. Using the computers capabilities only makes good sense. Compu-Quote markets a series of dedicated philatelic programs. These programs are for specific U.S., Great Britain, Israel, British North America or United Nations stamps. Stamps World deals with all stamps rather than certain specific sets.

Stamps allows the collector to enter the following data about each stamp in the collection: Country; Description; Gum Condition; Location; Catalog Number; Type, Year Purchased; Comment; Denomination; Quantity; Total Cost; Year Sold; Year; Condition; Total Value; and Total Sale.

The catalog number entry will accept up to six characters so you can use Scott, Minkus, Michel or any other method of cataloging. With the above data the collector is able to maintain records that will satisfy the most critical of collectors. By creating a record for a particular stamp and leaving the Quantity at 0 it will automatically appear on a printed report "Want List."

Printed reports are generated by the Stamps program include a Stamp Inventory Value Report, a Collection Summary Report, a Stamps Sold Report and a Want List. The program functions with any printer that works with your computer. Format is for 8½" x 11" continuous form paper.

The reports are clear and well organized. It seems to me that they provide all the information needed by the collector to manage any size collection.

Documentation with Stamps World is well written. 28 pages in length, 5½" by 8½" and paperback the docs cover the installation and operation of the program with little left to chance. Stamps requires MS-DOS or PC-DOS, 256K, 2 drives and a printer. Included with the program is an installation file for hard disk that does all the work for you.

Stamps World performs as billed. I could find no hidden faults. It wouldn't even lock up with a printer fault. If this occurs there is an error message telling you to get off the stick and get the printer up. After a few minutes I began to remember those envelopes full of stamps from some rainy afternoons 35 years ago. This program would have made it a lot easier to keep track of those stamps from all over the world. Let me see...Which trunk are those envelopes stored in?

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Too Much Computerized AUTOmation?

by Wayne A. Yacco

A pair of very clever new products have recently come into the microcomputer marketplace. They are both designed to take advantage of the growing market for display products which incorporate the IBM Enhanced Graphics Adapter (EGA) standard. You may even have already read some of the glowing reviews they are generating.

Of course, we are talking about the NEC Multisync (JC-1401P3A) display and the Paradise Autoswitch EGA (PEGA) card. Both of these products are designed to work with a wide array of video standards including the EGA. Although many products offer some or all of these same standards, these two are each the first of their respective category to offer a unique twist. They employ logic to sense the video signals being sent to them and reconfigure themselves automatically. They are smart.

The theory is that you can use all software that employ any of the many supported standards and your expensive hardware will determine how to display it perfectly without setting any switches or running a setup program. If the world were as perfect as a theory we would really be in business.

NEC's Multisync works with every IBM standard from the Monochrome Display Adapter (MDA) to the Professional Graphics Controller (PGC). It will work with virtually all the other popular interfaces for the IBM market (as well as many non-IBM systems). It is capable of displaying resolutions up to 800 by 560 and supports not only digital RGB but analog RGB as well. Analog RGB allows the simultaneous display of very large numbers of colors.

The PEGA board can interface the EGA modes, the Color Graphics Adapter (CGA) modes, the MDA mode, plus the Hercules graphics mode and the Plantronics color modes. It's quite a palette full.

It is at this idyllic point that empiricism raises its warty head. While a system employing these components might be expected to run just about any software ever written, in practice, it will not. Most software, yes, All software, no. Your essentiall software, that is the question!

Here is the bad news. The very program you bought for its own intelligence is the software that is least likely to work properly with this new hardware.

In the past, if a program gave you a choice among outputs, it probably required you to select an installation that matched your hardware. Only one signal would be sent out once the installation procedure was performed. Now, because so many video standards have become popular, a number of software designers have been including the ability to determine what hadware is installed and to output the appropriate display information. Yes, automatically.

It seems that, at least in some cases, there is a failure of concordance. Perhaps the software modifies a port on one of the chips that control the CGA mode while the PEGA requires a different value because it is trying to simulate the EGA. Maybe the software detects the presence of the EGA circuits and refuses to work with a humble color monitor, even though the PEGA supports one. Then again, the problem may be intermittent, occurring only the first time a program is run and, after some port has been set or reset, not recurring until the system is rebooted. Sometimes the system will fail when another program, such

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AUTOmation

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as a piece of resident software that uses a different display standard, interacts.

Whatever the cause, whoever is at fault, the result is a great inconvenience at least; a total inability to run an indispensable program at worst. The results are not easily predictable and it is very difficult to fix blame.

Ignoring the fault of automatic mischief, it is more a matter of design philosophy than absolute right and wrong. Multi-mode hardware that does not switch automatically may require an extra setup program to be run first and that can also interfere with software. Setting dip switches will probably always work but it is definitely always a nuisance. On the other hand, when the software is not quite so smart, the hardware seems to work fine.

The important thing for a prospective buyer to remember is that one must always "try before you buy." Anyone using Microsoft's Word might consider a hands-on evaluation to test his, or her, ability to tolerate its inconsistencies with this type of arrangement. If resident, pop-up programs are added, Word can become still more complicated.

My EPROM burner is probably a special case but it completely locks up the display until I exit and run (blind, mind you) the PEGA.COM program supplied by Paradise. PEGA.COM resets the ports but it is not intended for that purpose. Using it to restore video output is known as a kludge but—that's another story.

It must be admitted that, given a properly chosen set of software, this could still be a dream system. In fact, no one twisted my arm, paid me or even loaned me the hardware to do this review. I bought it all with rubles hard earned in the capitalist computer mines and I'm not ready to part with it yet.

Even in the worst-case scenario of incompatibility, the least-likely villain is the marvelous Multisync monitor. The Multisync has its own minor faults to be certain. For starters, it is not possible to completely eliminate the picture using the brightness and contrast controls.

Phosphor burn occurs when an image is left on the screen for a prolonged period and can be recognized when the image remains after the monitor is turned off. This is also known as monitor herpes because once you've got it, you've got it. If the user plans to leave the system for an appreciable period of time, he must find and use a program to blank the display and prevent burning in the screen. If you don't have such a program, I'll give you one just for reading *Computer Shopper* (and sending me six dollars to cover my expenses). The program is called NOFF and turns the NEC OFF. Clever, eh? It's not resident so it won't interfere with anything else or take up any memory. It uses DOS calls so it should run on any MS- or PC-DOS machine but it's also written in Assembly to run fast. If you have a hard disk, it will use only a single cluster—no copy protection.

My second minor gripe is that alignment of text, when switching to text from graphics screens, is awkward because the MODE command cannot be used to move text left and right. The tiny knobs provided for the controls add to the potential for frustration as does their location on top, and set back from the front, of the monitor. One of these sliding specks does slightly compress the screen allowing better text justification.

A nice feature of this monitor is its ability to display monochrome text in any of seven colors. Why they put the dip switch on the back of the monitor is a mystery however. This is a deep monitor and the buttons on the rear are very far away and likely to be close to the wall if one is present behind your desk. It is certainly impossible to reset a dip switch in this position without major inconvenience.

OK, you say you never tire of the same old cerulean text. Fair enough. But, if it is possible to justify a dip switch for color selection, it is not possible to justify a toggle for the analog/digital switch. Setting this toggle to the wrong position for your adapter could fry your whole system! This should have been implemented with a recessed slide switch of the type commonly used to choose between input voltages and other potentially destructive alternatives. If any clone makers are reading, let's be sensible

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Aristo Computers has added the newly announced Innoventions' SideClock to its product line.

SideClock is a Clock/Calendar that snaps on the motherboard without wasting an expansion slot.

Using its special contacts, the Innoventions' SideClock instantly snaps onto the same slot that carries another expansion card. This method of attaching to an expansion slot without nullifying its usage for add-on cards is patent pending by Innoventions and represents a new design concept that can be applied to other devices.

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SideClock is compatible with PCs, XTs, ATs and most compatible computers.

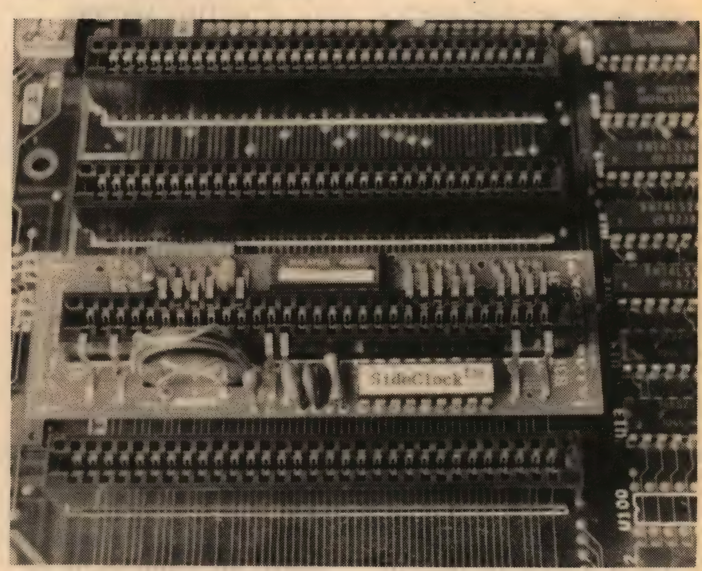
The Innoventions' SideClock retails for $59.00 and it is offered to both dealers and end users. It comes with a 30 day money back guarantee and a 2 year limited warranty.

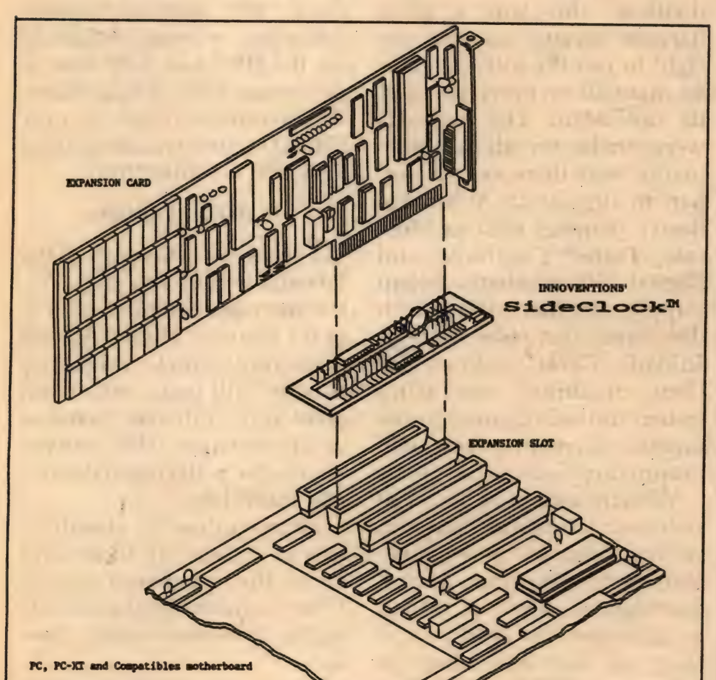
SideClock was designed by David Feinstein of Innoventions, Inc.

Aristo Computers is the major distributor of Innoventions. In addition to the newly announced SideClock, Aristo Computers carries the Innoventions' 640K Motherboard upgrades for the IBM-PC ($49.00), IBM-XT ($39.00) and the COMPAQ Portable ($29.00).

For additional information, contact Aristo Computers, 16811 El Camino Real, Suite 213, Houston, TX 77058. (800)3ARISTO, or in Texas: (713)480-6288.

Mention that you read about it in *Computer Shopper*. ●





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Before DOS—Recollections

by Andrew M. Fried/Stan Veit

For those of us that have been around microcomputers for some time, it's hard to remember a time without MSDOS. Actually, however, PCDOS/MSDOS has only been around since August, 1981. That makes the operating system a youngster only five years old.

After five years and seven revisions, DOS continues to develop and mature. It has become the standard worldwide for Intel microcomputer operating systems. It has already provided profound influence on at least one generation of students and is expected to continue throughout the education system for years to come. To many, being judged computer literate hinges on ones knowledge of DOS and its intricacies.

I thought it would be interesting to take a look back to a time before the IBM PC; in order to understand the evolution of PCDOS/MSDOS, we need to take a look at the sequence of events leading up to the introduction of the single most successful microcomputer system ever produced. So lets reminisce for a moment and look back six or seven years.

Before Operating Systems

In these early days of microcomputers, systems were shipped without an operating system; the hobbyists were forced to write their own. This wasn't a large problem until the advent of disk based systems because they only required a mini-operating system called a monitor. This monitor enabled the computer to initialize the computer and its I/O chips, to receive input from a teletype paper tape reader, output to a paper tape punch and to access and dump memory and to print the contents of the registers of the CPU. It allowed programs to be loaded into memory and to access and run them. Later cassette tape capabilities were added. Some monitors also included the ability to insert and remove breakpoints used for de-bugging programs. MITS, the maker of the Altair computers came out with the first practical floppy disk unit for personal computers. The disk system however was controlled by a version of Microsoft (Altair) BASIC which contained disk commands.

In 1973, while working as a software consultant for Intel, a man named Dr. Gary Kildall developed an operating system for use with an experimental computer system. The operating system, which he called "Control Program/Monitor" (or CP/M, for short), was significant in that it supported an 8-inch disk drive built by Shugart Associates.

Kildall showed the system to the folks at Intel but they declined to market or further develop the product because it was "too slow" for their PDP-11.

There was a large cost associated with the research and development necessary to create a custom operating system for each computer. IMS Associates Inc., the manufacturers of the IMSAI which was selling more computers than the original Altair, came out with a floppy disk system and licensed the CP/M system from Kildall's Digital Research Inc. Individuals could also buy CP/M from DRI and write their own BASIC Input/Output (BIOS). The original system sold for $75 to an individual, this was a great bargain because you got the right to run the software plus six manuals on every phase of its operation. The manuals were terrible but all the information was there even if you had to dig for it. When industry pioneers such as Morrow, Tarbell Electronics and Digital Microsystems began shipping the first systems with disk drives, they chose to adopt Kildall's CP/M program for their machine's operating system instead of going to the expense of creating their own proprietary system.

With the advent of the S-100 systems, hardware between systems became interchangeable for the first time. Almost overnight, user groups sprung up all across the country and they all had one thing in common—CP/M.

The S-100 systems, having such names as Altair, IMSAI, Processor Technology, Cromemco, Polymorphic, North Star, CompuPro, were generally based on the Intel 8080 CPU, or the Z-80 processor, an 8 bit CPU made by Zilog Inc. which used the instruction set of the 8080 and added some extra instructions. (Z-80s were also second sourced by several chip makers including T.I., NEC and Mostek.) The original Z-80s ran at a clip of about 2.5 mHz, which in those days was pretty fast! The average memory size for an S-100 system with a disk system was around 32K, with 64K being the maximum directly addressable by the CPU, an amount considered miniscule by today's standards.

By 1980, CP/M had become the undisputed de facto to standard for microcomputer operating systems. Available for the 8080 and Z-80 central processing units, CP/M claimed an installed base of over 250,000 systems made up from over 300 manufacturers.

S-100 and Others

For several years prior to the introduction of the IBM PC, the microcomputer market was in it's infancy. Those involved in the revolution (or evolution, as some will point out!) often point to two different groups as co-sponsoring the movement—the S-100 based systems and the"others."

Representing the classification of "others" in those days meant that you owned a South West Technical Products, OSI, Apple, Commodore or a Tandy.

The main central processors of the day for the non-Z-80 or

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AUTOmation
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and put the entire ensemble on the front of the monitor when you copy the Multisync.

Speaking of clones, there are already some on the scene. The Paradise card is available in an OEM version under the Taxan label as the 560. The Taxan card usually sells for a little less than the original even though the two cards are identical down to the silk screening on the card that says Paradise.

At least two companies have come out with reasonable facsimiles of the Multisync. Teknika has a very similar offering, the MJ-503, with only a single, green alternative to monochrome but with a two year warranty on both parts and labor, double the NEC insurance on labor. Several of the most used controls are right on the front of the Teknika. Sony has an entry with .25 dot pitch (compared to the already fine .31 pitch of the others), the CDP 1302.

A final caveat. These products are expensive; take care that you really need them. If you're only going to be running EGA applications, you can save about a hundred dollars by buying a single function EGA monitor. There are also slightly more capable EGA monitors that switch only between EGA and CGA. They too cost less than the Multisync and its ilk. Buying a Multisync can be very cost effective if it will eliminate the need for an eventual upgrade or if it is used to replace some of the higher resolution monitors.

If you do jump in, protect your investment. Use a product that blanks your screen. If you can't find a screen saving program you like or don't want to pay extra for features you may never use, send check or money order, for six dollars per copy, payable to W. Yacco, Box 4239, Burbank, CA 91503 and specify that you want NOFF. ●

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Menu Relief for IBM/Compatibles

Reviewed by Lon Andrews

Directories and Path Statements for a non-computer oriented can be a tiresome mess of confusion and frustration. For this reason many of us that set up small business install a menu program to eliminate the necessity of deciphering "what program is in which directory and what path do I need to call up the program." In most cases a series of .BAT files do the job. The problem arises a little later when they add some new programs to the hard drive and want to expand the menu. Usually by this time the tech is long gone and the fun begins! The end result is a phone call to come help us out of this mess! PLEASE!!

MENU EASE is a simple, low cost answer to this problem that I will be using from now on. Applied Business Concepts has an excellent idea in this program. I know that there are several on the market that are quite involved and do wondrous things with menus. Not so with MENU EASE. It is so simple that anyone that can turn on a computer can set it up and have it running in less than 10 minutes.

In order to set up the menu the user runs an install program that asks for the name of the program that you want to include on the menu, the command needed to call up the program and which directory the program resides in. This can be repeated up to 12 times and then saved. Once the program has been saved the statement ME is inserted in the AUTOEXEC.BAT file. This can be done with EDLIN or, as I show new users to avoid having to use EDLIN. with a word processor.

When you boot up the menu will appear with the programs you have entered. Simply moving the cursor to the program and hitting ENTER will cause the program to run. Non compiled programs will not run from MENU EASE. When you exit from the program you will be returned to the main MENU EASE menu.

Along with the programs that you enter MENU EASE provides several other options: FORMAT, COPY, BACKUP, RESTORE, DISKCOPY and DOS. These are some of the most commonly used DOS functions. Each of these functions are made a little easier to use by prompts provided by MENU EASE.

Once the menu is set up other programs can be added or those already entered can be deleted by reentry to the set up program. This can be accomplished directly from the menu by using SHIFT * .

This is one of the "nice little" programs that come along that are worth their weight in gold in time saved and frustrations eliminated. Nothing complicated but well written and easily used. This program is not necessarily intended for the serious experienced user or the programmer that will sit down and zip out his own data base or word processor. MENU EASE is for those that won't or can't take the time to learn to write their own. I know at least two secretaries that are going to love it!

The documentation with MENU EASE is a little over seven pages and most of the information contained therein is over and beyond the call of duty. The prompts are self explanatory.

For the price you can't go wrong with MENU EASE. Try it, you will like it.

MENU EASE $29.95, $2.00 S&H (MC/VISA). Applied Business Concepts, Inc. P.O. Box 1284, Titusville, Florida 32781-1284, 800-641-7673, 800-325-3238 (Fla.) ●

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VISA

Before DOS

continued from page 162

8080 CPU's hackers delights were generally MOS Technology's 6502 (used in the Apple, OSI, and Commodore systems) and Motorola's 6800 series microprocessors (used in the SWTPC systems). On the other side, the S-100s and Tandy TRS-80 computers almost all were using the Zilog Z-80 chip. Tandy was an exception because they used a different DOS called TRSDOS (although CP/M was made available for these machines by third parties).

One real problem with all the systems that fell into the "others" classification was the fact that no real standards of any type were adhered to. Each manufacturer created their own operating system and disk format.

Back To Basics

During this same time, another de facto standard had emerged in the area of high level languages—Microsoft BASIC. For the first time, programs developed on one system could be used on another system even though the processors were different.

When IBM decided to enter the microcomputer market, they decided on using the Intel 8088 CPU. The most logical language to be bundled with their systems was Microsoft BASIC a language known and used by the vast majority of microcomputer users throughout the United States.

IBM approached Bill Gates (owner of Microsoft) and formed an agreement with him for the use of Microsoft BASIC. They also asked him to approach Digital Research, Inc., Dr. Kildall's company that was marketing CP/M, and ask them to port a version of CP/M over to Gates "customers" Intel 8088 based machine. Gates was to keep IBM's plan a secret.

At the time Gates approached DRI with this plain, Dr. Kildall was so busy porting his operating system over to dozens of machines and because he had no idea the intended customer of Gates was to be Big Blue, Kildall informed Gates that they could not meet the time schedule requested by the "customer" for the soon to be released 8088 based machine.

The Creator

Not giving up easily, Gates located a small company called Seattle Computer Products. This company had produced a CP/M look-alike operating system for an 8086 based computer. Gates was able to purchase the rights to the operating system and in turn adapted it for the IBM PC and licensed it to IBM. It was this operating system that would be renamed "PCDOS 1.0." It was officially released in August, 1981; and things haven't been the same since.

As you might imagine, the original PCDOS was strongly influenced by CP/M in almost all respects. This proved to be an asset as those familiar with CP/M could learn PCDOS in an evening. Of equal importance, many of the philosophical design characteristics like BDOS calls were also implemented in the new operating system. This helped system level CP/M programmers drift into the PC world a little less painfully.

The IBM computer itself came with a motherboard which contained only 64K of RAM. After all, who could ever want more?

The first major revision of PCDOS (version 1.1) occurred in May, 1982. The original version of DOS was modified primarily to support double-sided diskette drives. I can still remember the four digit prices for those drives!

During this time, Bill Gates formed an in-house programming team charged with the task of producing the next version of PCDOS. A change in the philosophy of DOS occurred; the next version of DOS was to abandon many of the CP/M concepts and replace them with strong influences from the Unix system. This was not surprising as Microsoft had also developed a Unix clone operating system which they called Xenix.

The first in-house version of PCDOS was released in March 1983 and carried the version number 2.0. The main reason for its introduction was to add support for the IBM XT's hard disk. From this point on, however, CP/M's influence on PCDOS began to diminish substantially.

Subsequent revisions of PCDOS included 2.1 which occurred in October 1983. It was aimed at providing support for the new half height drives used in the PCjr and the PC Portable).

Version 3.0 added support for the high density drives of the IBM AT and was released in August, 1984.

PCDOS 3.1 was released in March 1985 in order to enhance support for the IBM network, while version 3.2, which was released in July 1986, provided support for the new 3.5" disks used in IBM's new portable computer.

It is clear that the gap between DOS and Unix have been diminishing with each successive update. There is talk that the next revision to DOS which will be available here in the states will be DOS 5.0. Anticipated delivery is Fall, 1987. It may also be the first DOS to obsolete the IBM PC and its 8088 CPU.

Of equally more importance, it may open a new page in history as being the beginning of the multi-user/multitasking system for the next seven revisions of DOS. ●

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Bondwell Debuts $499 PC-Clone

A $499.00 IBM compatible home color computer that features enhanced audio and graphics capabilities, 256K RAM (expandable to 640K), built-in disk drive, expansion ports, MS-DOS and GW-BASIC software was introduced by Bondwell.

The new X'Press 16 home computer was unveiled at the Fall 1986 Comdex Trade Show in Las Vegas, Nevada, at Booth #W356 in the West Hall. The computer will be available for delivery to dealers early in 1987, according to Joe Lacayo, Vice President of Sales.

"The X'Press 16 is a mass marketer's dream machine," Lacayo said. "It is designed to offer the consumer the best of both worlds—a sophisticated color game machine for the home, an incredibly low retail price, and the IBM compatibility needed to run business software. You couldn't ask for anything more!"

According to Lacayo, the X'Press 16 will also feature an advanced video display processor, 3 channels of sound with 8 full octaves per channel, parallel printer/joystick/and mouse peripheral ports, monochrome composite and RGB video outputs, a 512x212 pixel resolution with 16 color output, and a QuickShot X joystick controller.

To maintain the sales momentum for the Bondwell-8, the company announced that, effective immediately, it was reducing the suggested retail price of the computer $300.00—to $1295.00.

"The competition in the laptop segment of the portable market has become increasingly price sensitive," Lacayo explained, "and we believe this price reduction aggressively reaffirms the Bondwell-8's price-performance leadership position."

The Bondwell-8 is a fully IBM compatible, 11-pound unit that features 512K RAM, a backlit 80Cx25L LCD display, built-in 3.5" floppy disk drive, RGB, and composite color video outputs, RS232C serial port, Centronics type printer port, second disk drive port, modem, a rechargeable battery with AC adapter, real time clock, MS-DOS and GW-BASIC software.

For additional information contact Bondwell, 3300 Seldon Court #10, Fremont, CA 94539; (415) 490-4300.

Mention that you read about it in *Computer Shopper*. ●

Maynard Ensures Compatibility of New Computer

Maynard Electronics announces compatibility with the new computer recently announced by IBM Corporation.

IBM's new XT 286 is compatible with Maynard's MaynStream tape backup systems, MaynStream Plus combination hard drive/tape backup, DX external hard disk drives (up to 110 megabytes), and Mouse. Maynard is also introducing products designed specifically for the IBM XT 286. The new Accent 286 card will deliver both extended and expanded memory capabilities, as does the Accent AT version, but it has been custom designed to fit in the smaller XT 286 expansion slots. This version of the Accent line will also be compatible with the Compaq 286.

For further information contact Maynard Electronics, 460 E. Semoran Blvd., Casselberry, FL 32707; (305)331-6402.

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Cordata Integrated Desktop Publishing Systems

Capitalizing on its proven technology in the laser printer and microcomputer fields, Cordata Technologies, Inc. has introduced two fully-integrated PC-based desktop publishing systems.

The first public demonstration of the systems, called the Intellipress and Intellipress/-Ventura Publisher electronic publishing systems, took place at COMDEX/Fall '86.

"The Intellipress family is comprised of the first cohesive, affordable systems for the MS-DOS environment that can be properly termed 'desktop publishing systems,'" said Daniel R. Carter, president and chief executive officer. "Easy to learn and use, they are 'plug 'n play' system solutions that bring the power of true desktop publishing to hundreds of thousands of publishing professionals. For the first time, they can purchase all the necessary fonts, hardware and software components in a single solution."

The Intellipress family will be marketed to medium and large corporations, educational institutions, government and reprographics organizations through a network of value-added resellers and computer retail stores.

Carter said the entry-level Intellipress system, which features Aldus Corp.'s PageMaker page composition software program running in the Microsoft Windows operating environment, is targeted at first-time desktop publishing users because it requires virtually no programming knowledge.

"Intellipress/Ventura Publisher, which is the next step up in our electronic publishing system family, is aimed at full-time publishing professionals and is better suited for environments where heavy production of documents is required," Carter said. He explained that Ventura Publisher is fast and provides fully automatic pagination of close to 1,000-page documents.

Both the pre-installed PageMaker and Ventura Publisher are the market's leading interactive page composition packages, providing users with features previously available only on much more costly systems.

These features include WYSIWYG (What You See Is What You Get), a complete display screen representation of what the printed page will actually look like; easy merging of text and graphics or scanned images; and the ability to paginate lengthy documents.

"Everything from a simple one-page newsletter to complex engineering documentation of 100 pages or more, complete with drawings, halftones and schematic diagrams, can be created and produced on either Intellipress system," Jack Strange, director of product marketing for the Electronic Printing Systems strategic business unit. "The systems also feature an easy-to-read, ultra high-resolution 15-inch black on white monitor; fast, high resolution output; and the optional ability to scan line art, photographs and other images," Strange added.

In addition to either PageMaker and Microsoft Windows or Ventura Publisher, other standard software for both systems includes the MS-DOS operating system and three font families—Bitstreams' Swiss and Dutch, and Cordata's Momento.

Both Intellipress systems combine a powerful IBM AT-compatible computer, high-performance desktop laser printer, 15-inch display monitor and a mouse pointing device. A digital input scanner is optional.

Cordata Desktop Publishing System

The computer is based on the 80286 microprocessor running at a very fast 8 megahertz. It features 640 kilobytes of random access memory, a 1.2-megabyte floppy disk drive and a 30-megabyte hard disk drive.

The laser printer is similar to the high-end model in the company's Desktop Printshop laser printer family. Printing quietly at less than 55 decibels, the machine features high resolution of 300x300 dots per inch and the ability to produce a full page (8.5 inches x 14 inches) of full-resolution graphics.

According to Strange, the 1280x800-line ultra-high resolution of the 15-inch black on white display provides "startling clarity of both the smallest and largest fonts and graphics, an absolute requirement for the publishing professional."

The optional digital input scanner features a 2544-pixel sensor and is capable of 300x300 dot per inch resolution. It supports 16 shades of gray and is available on either sheetfeed or flatbed models.

To lend marketing support for the Intellipress announcement, Cordata has launched a new advertising campaign consisting of two-color, four-page inserts in many of the reseller-oriented and end user computer trade publications.

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For more information contact: Cordata, 275 E. Hillcrest Drive, Thousand Oaks, California 91360. 805-495-5800. ●

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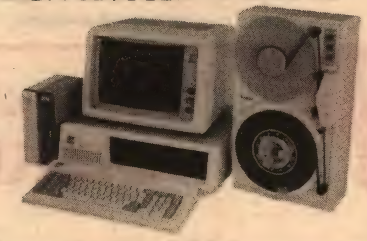

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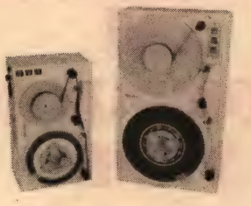

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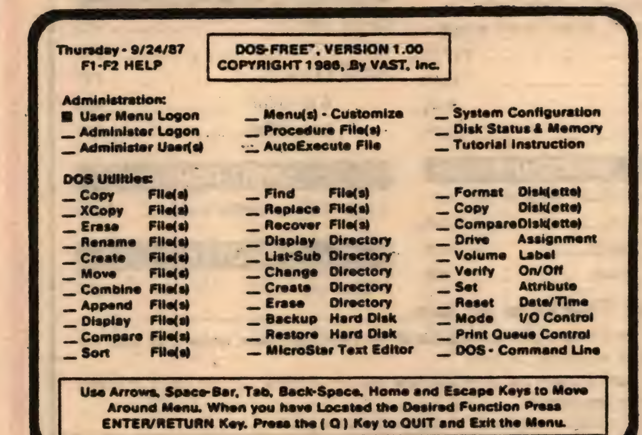

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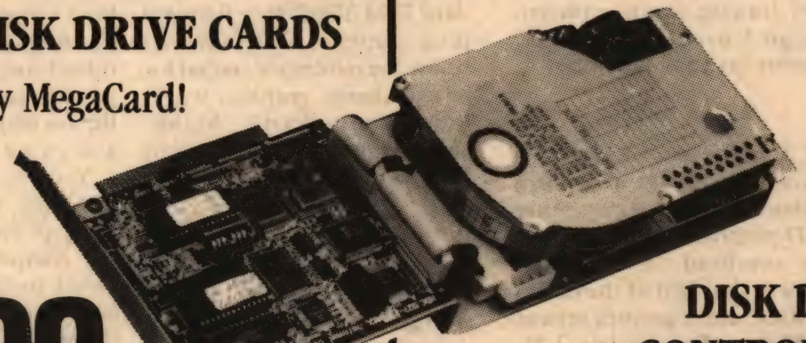

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CADpak Version 1.2

by Steven M. Lord

CADpak 1.2, by EHco Services, Inc. of Houston, Texas, is a recent entry into the low-priced end of the design and drafting software market. At a list price of $125, CADpak offers a basic two-dimensional drawing capability for a very low up-front investment in equipment, software, and training. It is aimed at the part-time user who needs to create drawings with minimal training and is not intended to compete with full-featured design programs such as Anvil-1000MD or VersaCAD Advanced. CADpak is designed to be, and in most respects is, easy to learn and use.

Getting started with CADpak is simple. The sixty-five page user manual is skimpy but clearly written and system setup should present no problems if you are familiar with the basic features of MS-DOS. CADpak is not copy protected, there are no difficulties with making backups, porting the software to a hard disk, or switching it onto a new computer. After loading any mouse or a digitizer drivers, you simply type "cadpak" and the standard drawing screen, representing an A-sized drafting sheet, appears on your monitor.

Screen Layout

CADpak's screen layout is logical and similar in concept to those found in many other CAD programs. It has a status line overhead, a command menu to the right of the drawing area, and a prompt area at the bottom. Pen number (1-8), drawing level (A-II), line type (1-8), and cursor coordinates are always visible on the status line. The prompt line indicates the current command and the unexpected input. On the right side of the screen, the menu displays a small subset of frequently used commands, which you pick off directly using a mouse or digitizer puck. To access the full command set (without using the keyboard), you must bring up a command screen in place of the drawing. This takes several seconds on an ordinary PC and the delay quickly gets annoying. Typing is faster if you are familiar enough with the command list.

CADpak provides no way to expand the drawing area beyond the D-size sheet of the largest standard screen, forcing you to draw large objects at less than full scale. This, combined with a very limited zoom range, makes CADpak unsuitable for large mechanical layouts. Resolution is also a problem because at present CADpak supports only standard IBM 320x200 or 640x200 pixel graphics. This falls well below the minimum needed for serious design graphics work, though admittedly higher resolution displays add substantially to hardware cost.

Drawing Tools

CADpak's command set for creating and editing drawings is largely a simplified subset of the commands found in higher-priced CAD packages like AutoCAD. You build geometries from combinations of straight lines, circles, arcs, and rectangular frames. While you can force lines to run horizontally, vertically, or at a fixed angle using a command called "Lock," in the normal default condition lines "rubberband" from an initial point, dynamically following the cursor until an endpoint is set. A special feature is the ability to force a line to follow the cursor in a rectangular path—a sort of rectangular rubberband—that can be toggled on and off by hitting a function key. CADpak also allows you to type in exact coordinates from the keyboard.

In the "Sketch" mode, you string lines from point to point sequentially without defining a new start point for each line segment. A peculiarity of this mode is that single pixel extensions to a segment are not accepted. One of CADpak's nicer features is a command called "Close" that automatically joins a line to the nearest point on an existing line or figure. By using Close, you avoid accidental mismatches in closing up figures which later show up on a drawing plot.

You can select any of eight line types, but these only show up on plotted drawings, not on the computer screen. If you forget to switch back to solid lines after using another type, the screen image won't warn you (except on the status line), and you will wind up with a very unexpected picture in hardcopy. Up to eight drawing layers are also available, but the controlling "Show" command lets you display only all the layers or any one layer at a time.

To help in constructing rectilinear figures, you can superimpose a grid of points, crosses, or lines on the drawing area at any spacing you choose. The system then snaps the cursor onto (or between) the grid-points as it moves, giving you the ability to visually connect lines to exact coordinates. Unfortunately, CADpak draws its grids with ponderous slowness, so you sacrifice redraw speed to get this convenience.

Circles are drawn by selecting the center point and the radius with the cursor. This works fine except in the case where only the desired edge tangents are known, such as when fitting a circle into (or on the end of) another figure. Then it can take quite a bit of playing around to get the figures to intersect perfectly.

You make arcs by picking two endpoints and one intermediate point. Unfortunately, there is no way to specify an arc by center and radius. The screen drawing rate for circles and arcs is slower than line drawing, but not annoyingly so.

CADpak has a "Frame" command that speeds up production of rectangular shapes. Under Frame, you draw a rectangle by defining two diagonally opposite corner points. The frame rubberbands like a line as your cursor moves the second point toward its final position. Some forethought is required, however, because you can only delete, move, or change a frame as a unit, whereas a rectangle made up of four ordinary lines can be edited more extensively. For example, it is impossible to put a radiused or chamfered corner on a frame. One advantage to using frames, however, is that you can easily stretch frames in

continued on page 169

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CADpak
continued from page 168

either dimension using the "Change" command.

Dimensions and Text

Dimensioning and annotation features are limited. CADpak's semi-automatic dimensioning system lacks many of the detailing formats needed to create finished professional drawings, such as call-outs, diameters, parallel dimensions, tolerances, detailing symbols, and ordinate dimensions. While you can produce almost any format through the general editing commands, it is slow work compared to using the semi-automatic features.

Dimensional accuracy is a more serious problem. In the present (July 1986) version, you often cannot get the automatic dimensions to come out to precisely the correct value. For example, a 2.000 inch length might come in as 1.997 inches. This is a serious annoyance for sketches and a disaster for machine layout and detailing. Small System Solutions is aware of this problem, and presumably it will have been fixed by the time you read this—but check it out before buying.

Another useful facility lacking at present is automatic crosshatching of enclosed areas. You can draw crosshatches line by line, but it is a time-consuming process.

CADpak provides only one text font, but text may be scaled, rotated, and placed wherever desired, so one font is perfectly adequate for most purposes. You may enter only one line of text at a time, and there is no automatic text justification. Screen response in drawing text is extremely slow—unnecessarily so since the program attempts to draw out all text, even when the drawing scale has shrunk the letters to single dots or the text is off screen. CADpak badly needs an algorithm to replace small text entities with a single line to speed up screen redraw.

Symbols and Overlays

Beyond the construction element level, CADpak includes a facility to define assemblies of elements as named symbols.. These are stored in the drawing file when it is saved to disk, and you can later call them back by name to use as elements in other drawings. Symbols may be copied, moved, rotated, and scaled as units. By using the "unglue" command, you can divide a symbol back up into its individual elements for editing. CADpak also provides a command to define special "tie points" on a symbol to which other drawing elements may later be attached. This symbol facility allows you to create library drawings of standard electrical, mechanical, or architectural components.

CADpak has some unusually nice features for creating overlays and combining separate drawings into a single drawing. The "Include" command will add any saved drawing to an existing screen as an overlay justified to the lower left hand corner of the screen. Used with a bit of forethought, this command makes it relatively easy to prepare small layouts in machine design or architecture. Two other commands, "Cut" and "Paste," permit you to select sections of drawings or entire drawings and combine them with a current drawing at any location you choose. These commands work much like the cut and paste features found in some word processing packages, and are very easy to use.

CADpak has a "Zoom Window" command that is badly needed when working with standard 320x200 IBM graphics. As in many CAD packages, the rectangular zoom window is defined by picking two diagonally opposite corners, and the included image is redrawn automatically to fill the screen. A related facility lets you shift the drawing across the screen by picking a new screen center with the cursor, though a full screen redraw is required here also. The zoom range is quite limited; beyond a certain point CADpak simply refuses to zoom in any further. This reflects the fact that CADpak uses an integer database of limited range and resolution. The zooming procedure gets rather slow with multi-element drawings, especially those containing a lot of text. This is another area where speedup would add greatly to the program's everyday usefulness.

Editing Commands

CADpak's editing commands include Delete, Move, Change, Rotate, Copy, Size, and Undo. The Rotate and Size commands apply only to symbols and text (though any element can be defined as a symbol if desired), and both have

continued on page 173

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Lightning—A Disk Cache Program That Works

Reviewed by Andrew M. Fried

Introduction

How would you like to decrease the access time to your floppy disks by seventy five percent? Speed up your hard disk by fifty percent? Interested in purchasing an intelligent RAM disk; one that knows what data you are using the most and manages it in RAM while the seldom used stuff is kept on disk?

If you answered yes to any of these questions, you will be very interested in learning about Lightning, a product currently being marketed by the Personal Computer Support Group in Dallas, Texas. I am not referring to the Borland International product with the similar name (a spelling checker named Turbo Lightning).

Lightning is a RAM resident disk-caching utility that contains proprietary algorithms which enable it to create an "intelligent buffer." When information is read in from a floppy or fixed disk, it is kept in a RAM buffer along with other data previously read.

Any subsequent disk accesses will cause Lightning to check its RAM buffers to see if the requested data is contained in its buffer. If so, Lightning returns the data without ever going to the actual floppy or hard disk; it essentially returns the data at RAMdisk speed. If, on the other hand, your data is not contained in the buffer, it will be read in from the disk and added to the intelligent buffer.

That sounds pretty simple, doesn't it? Well, it gets a lot more complicated because some time or another the buffer is going to get full. Once that happens, the sophisticated algorithms of Lightning try to decide what data is most likely to be accessed. It then flushes out data not likely to be used in order to create room for the new data. I am sure this is an oversimplification of the Lightning program, but you get the idea.

It is an amazingly intelligent and effective utility. The Lightning program consists of a single COM file only 7779 bytes. That's a pretty good indication that it was written in assembly. Remember the saying about good things coming in little packages...

Requirements

Lightning was written to operate on an IBM PC, XT or AT equipped with at least 128K RAM and at least one drive. Since nobody in the world has a PC with only 128K of RAM, it's safe to say that Lightning will work on all PCs and compatibles.

Lightning may be configured to make use of as much RAM as you can spare. It is also one of the few applications that supports the Intel Above Board Memory card. Utilizing above board memory, you may configure Lightning to use up to its maximum buffer size which is 1.5 megabytes!

Is There A Cache?

So what makes Lightning so good, you ask. Well, you have undoubtedly surmised that a computer can access its own memory one heck of a lot faster than it can access one of its peripherals. This is especially true of floppy disk drives.

One method of reducing this overhead is obvious—get faster peripherals! If you own an AT style machine, you can do just that. For a few extra hundred dollars you can obtain the so-called high speed voice coil disk drives. In essence, they operate at at least double the speed of the conventional fixed disks used in the XT family of computers.

The second conventional method of reducing disk access overhead was to create large RAM disks. It offers incredibly fast response since the flip-flops are the only "moving parts" involved in the access.

But RAM disks have a few drawbacks as well. To begin with, data written to a RAM disk is volatile. Simply put, if the power goes out or the machine locks up it's bye-bye data. We've all had that happen to us at one time or another. While the machines tend to survive the power glitches, they are prone to malfunction when pushed off the desk and kicked across the room!

The second problem with RAM disks is that they require huge amounts of RAM in order to be effective. For instance, it's difficult to run dBase III Plus in a RAMdisk; it's difficult enough to run it with a floppy! Generally, when using a RAM disk, you must place both the program as well as the data into the RAMdisk. If you have 640K of RAM and require 350K for the RAMdisk, you may have difficulty running your actual program due to a lack of space.

The third approach is the one taken by Lightning. It involves using the best of both worlds. The conventional floppy or hard disk is used to store the bulk of the data. As an access to the disk made, the information is read from disk and placed into a RAM buffer. Subsequent accesses to the same sector of memory are then made in RAM rather than hardware.

The most important feature built into this method is that writes made to a sector are automatically and instantly written into both the RAM buffer as well as the disk itself. This eliminates the blues when the lights go out.

Ease of Use

One of the really nice features of Lightning is that it is incredibly simple to use. With only a limited command repertoire, Lightning enables you to specify buffer sizes, activate and deactivate individual drives from buffering, write protect a drive, clear or display certain statistics maintained by the program, tell you if Lightning is already resident in memory and display a complete help menu on the screen.

Once you have established a set of parameters that work best for you, they can be included in an AUTOEXEC.BAT file. In this manner, the loading and running of Lightning will be totally transparent to the end user. The only thing the person at the computer will notice is that the drive lights don't come on as often!

For instance, if we wanted to load and run Lightning with a 256K buffer, you would add the following line to your AUTOEXEC.BAT file:

```
"L 256"
```

That was real complicated, wasn't it! If you wanted to see if the program was loaded, you would type:

```
"L ?"
```

The rest of the commands are as simple as the ones presented here. The only bit of information that appeared lacking in the 30 page users manual was information relating to the use of above board memory. It says you can use it; it just doesn't tell you how! I guess that it may be able to use the memory on its own, but it isn't documented.

Conclusion

Lightning is certainly one of the best utility programs to be

continued on page 178

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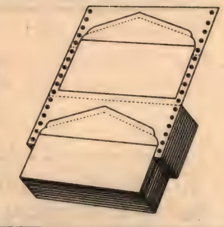

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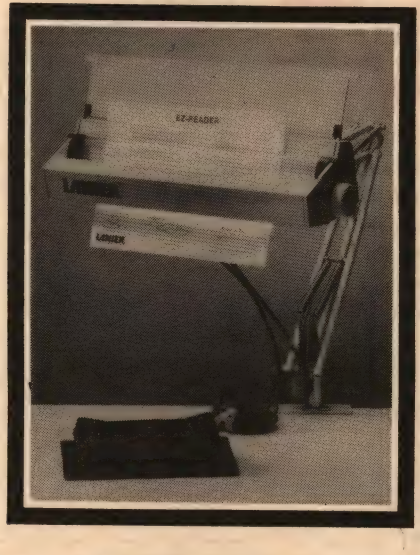

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Modgraph Introduces The Prism

Modgraph, Inc. announced the latest in their series of high resolution graphics controllers at the recent Siggraph show in Dallas, Texas. The model 3152, dubbed the PRISM, offers resolution up to 1024x780 pixels with a choice of 16 colors from a palette of 4096. It also supports 16 levels of gray scale for monochromatic graphics applications.

PRISM's on board NEC-7220 graphics controller provides primitives for line, arc, circle and rectangle, as well as hardware Zoom and Pan functions. In addition to a drawing speed of 1,000,000 pixels/sec., its dual-ported 4 Megabit memory makes it an effective graphics controller for the use in "CADD" and "WINDOWS" applications.

An RS-232 port is standard on the board to allow for direct connection of a mouse, digitizer, printer or another host processor, without an additional card slot.

The single height module offers RS-343-A RGB video output which is jumper selectable to adapt to a wide variety of displays.

Priced at only $1695 for quantity one, it is expected to become a popular addition to a PC based system that needs a clear and easy to read high resolution output.

Modgraph, established in 1981, is well known for its quality high resolution monochrome and color graphics terminals, as well as graphics controller modules.

For more information contact Modgraph Inc., 56 Winthrop Street, Concord, MA 01742; (617) 371-2000.

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CADpak

continued from page 169

a relative and an absolute mode. Undo is a general mistake fixer. Except in the case where you have Pasted or Included a previously stored drawing into your working drawing, Undo reverses the command given immediately prior to it and returns the screen to the state that existed before the last command. Undo is one of the most useful commands in the system, especially in the learning stages when unexpected results occur as new commands are tested.

The Delete, Move, Copy, and Change commands operate on elements, symbols, and text. Copy allows you to duplicate an element or symbol and place it at any selected cursor location. Move lets you interactively drag objects across the screen to a desired location. Change is perhaps the most interesting command because it performs a variety of functions. It can stretch, shorten, or rotate lines about either end under cursor control, shrink or expand circles, and stretch frames along either axis.

Unfortunately, all of these commands share an annoying problem: you will find it almost impossible to reliably select circles or arcs for editing in a field containing linear elements or circles enclosed in circles. Even when you place the cursor directly over a circle's boundary and click the select button, it will jump to the endpoint of any nearby line in preference to the circle. This is a crippling bug that must be fixed.

A less serious but nevertheless irritating problem is that it often takes more than one keystroke to get out of an editing command. This slows you down for no good reason and ought to be corrected.

CADpak lacks a number of useful editing commands that are included in many other CAD programs. Among these are: line breaks and trims, automatic fillets and chamfers, mirror imaging and mirror copy, selection of entities for edit by window, change entity characteristics (color, layer, line type, or pen), and rectangular and circular array copy. You can usually work around these absences, but at a substantial penalty in time and aggravation.

Other features of CADpak that should be mentioned include a series of help screens that you can call from within any command, a facility to temporarily reprogram the onscreen and function key commands, pre-set standard drafting sheet sizes, and a command to calculate the area of any polygon. The help screens are quite effective: it is conceivable that you could learn much of the system using the help screens alone. The standard drafting sheet feature automatically scales the screen area to equal an A, B, C, or D size drafting sheet. As with the distance and angle measurements, the polygon area measurement is easy to use and responds quickly.

Hardware Support

CADpak should run without problems on most IBM PC or AT compatible computers with at least one floppy disk drive and 156 kilobytes of memory. A math co-processor chip is essential for reasonable screen redraw times. In addition to the standard alphanumeric keyboard, CADpak supports several mice and digitizer pads as input devices. Hardcopy output devices include Epson compatible dot matrix printers and several low cost pen plotters, though dot matrix output is limited to the resolution of the display screen.

Conclusion

Overall, CADpak is a mix of some nice features and some substantial shortcomings. It's best features are the Cut, Paste and Include commands, the Close command to join lines perfectly, symbol libraries, a good Undo command, help screens, and an easy to follow manual. Its major weaknesses are low screen resolution, poor redraw speed with text and grids, the lack of an accurate full-featured dimensioning facility, drawing size limitations, limited zoom-in capability, and problems selecting certain elements for editing.

At $125, CADpak is one of the least expensive drawing programs available. It can give you an introductory glimpse at what CAD programs do, and may be worthwhile if your needs and your budget are both extremely limited. CADpak is aimed at the occasional user who needs a way to produce and modify relatively simple drawings. It is friendly enough that even if you use it only once a month and forget the commands in between, you can pick it up again in an hour or so. However, its simplicity also implies very limited drawing power.

If you are considering CADpak, you should be aware that several programs in the $300 to $500 range—particularly EasyCAD and Drafix 1—offers much more powerful drafting features at only a slight increase in total system cost. While it is quite possible to produce acceptable finished drawings with CADpak, its speed, resolution, editing, and annotation features fall well short of those needed for efficient designing and detailing at a professional level. ●

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PC-CICS For The IBM PC

The new PC-CICS package from Micro Focus emulates CICS, the mainframe transaction processing monitor, on the PC. Used as a companion product to Micro Focus' VS COBOL Workbench, PC-CICS allows mainframe users to gain the productivity of PCs for developing and testing their CICS applications. It also permits selected applications to migrate onto the PCs for single user operation, and permits a new class of application to be created which can run on both the PC and mainframe. Available now on controlled release, PC-CICS has an introductory price of $1,500.

"PC-CICS will increase the acceptance of PC based programmer workstations by allowing CICS development on the workstation to be insulated from CICS production on the mainframe," said Paul O'Grady, Micro Focus' VP of Worldwide Sales and Marketing. "There are in the order of 50,000 (Dataquest) CICS sites which can now take advantage of the development environment provided by PC-CICS and VS COBOL Workbench using the PC-CICS programmers will no longer have to be in contention for mainframe resources during the bulk of their development and testing and will quite simply have a better and more productive environment to work in."

With PC-CICS and VS COBOL Workbench, CICS/VSAM programs can be prototyped on PCs. Applications and design problems can therefore be detected early in the development cycle without the use of excessive mainframe resources. The costs and time which would be involved in reworking applications after coding, which results in schedule slippages and cost overruns, are therefore reduced.

In addition, because of the high performance of VS COBOL Workbench when running on a PC, the final production application can run on the PC as well as the mainframe. "This leads to greater flexibility in designing applications, especially distributed applications," commented O'Grady. "For example, in the insurance industry, outlying agents now have the capability of running similar code on both their PC and the insurance company's headquarters' mainframe."

PC-CICS is used with VS COBOL Workbench (Version 1.2) to support the compilation and execution of CICS Command Level COBOL Programs, supporting a wide range of BMS and VSAM KSDS commands on an IBM PC/XT/AT or compatible microcomputer.

A screen development system is provided (upward compatible from the existing Micro Focus CO-Maps 1.0) allowing the user to develop BMS mapsets and maps for use with the PC-CICS system. The facility will also generate corresponding BMS macros for uploading to the mainframe along with the Command Level source programs for use with the mainframe CICS system.

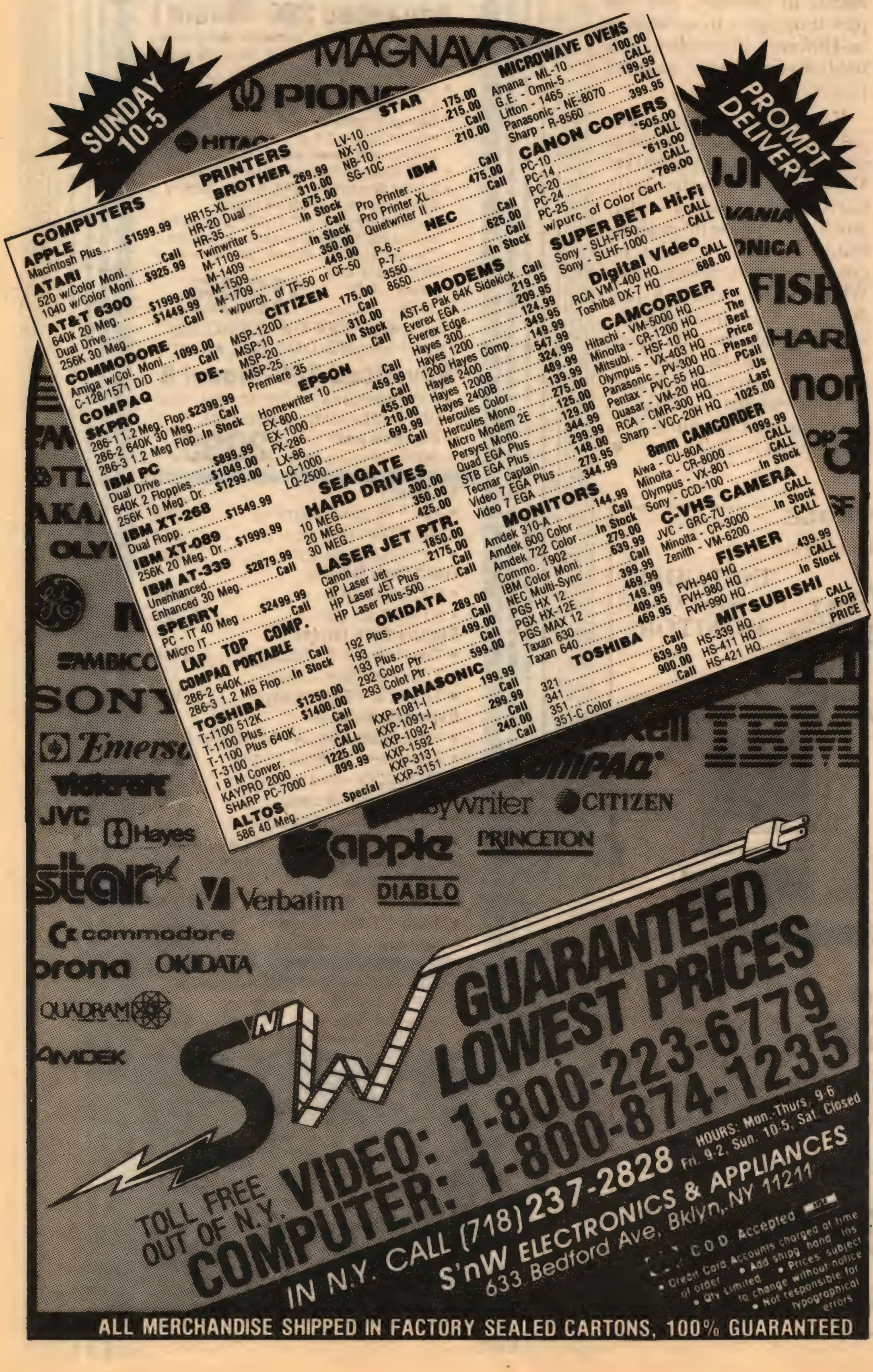
A facility is provided for the association of transaction id's to programs (similar to the PCT in the mainframe system), and to define and generate VSAM KSDS databases and file handlers. The PC-CICS system also allows the user to define multiple directories for use by the PC-CICS system facilities.

PC-CICS preprocesses the CICS command source code in the user program and converts it to executable intermediate code through the VS COBOL Workbench Check facility. The program may then be executed by PC-CICS and tested using VS COBOL Workbench's Animate facility. Features in Animate include a single-step code execution, querying and modifying data items and establishing breakpoints. Many CICS ABEND conditions, such as MAPFAIL and DSIDERR, are also supported. The Compile facility within VS COBOL Workbench can then be used to convert tested intermediate code into high performance object code for running the final application on the PC if required. PC-CICS also enables programmers to run their CICS programs without activating the Animate facility within VS COBOL Workbench.

A run-time version of PC-CICS is also available to run CICS applications on a PC without requiring the full development system. This is available at an introductory price of $100.

For further information contact Micro Focus, Inc., 2465 East Bayshore Rd., Ste. 400, Palo Alto, CA 94303; 415-856-4161.

Mention that you read about it in *Computer Shopper*. ●



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Floppy Drive For Portable Computers

At Comdex/Fall '86 Maynard Electronics announced a 3.5 inch floppy drive for the IBM PC, XT and AT that holds 720k of data. The 3.5 inch floppy drive allows communication between desktop PCs and portable computers. It also provides a bridge from 5.25 inch disk drives to 3.5 inch drives.

The drive is available in an internal and an external (portable) version for the PC and XT, and an internal version for the AT. These drives will operate off of any Maynard 5.25 inch floppy drive controller or any other 100 percent IBM-compatible floppy drive controller. The internal version comes with a faceplate that custom fits the drive for a regular half-height floppy bay. The external version includes a power supply and, therefore, does not use any power from the computer. Copying from a 5.25 inch format to a 3.5 inch is as easy as making a backup copy of a diskette. Maynard's 3.5 inch floppy drives operate in the same manner as a typical 5.25 inch drive.

Users can convert files and applications from 5.25 inch desktop computers to give 3.5 inch laptop computers the same capabilities. Many large software companies, including Lotus and Microsoft, are beginning to offer their key programs on 3.5 inch diskettes. Maynard Electronics is fully in favor of that technology and the move toward full-function laptop computers. Maynard plans to produce more supportive products for laptop PCs. The internal drives have a list price of $250 and the external/portable drives sell for $350. As with all floppy drives sold by Maynard, they carry a full one year warranty.

For additional information contact Maynard Electronics, 460 E. Semoran Blvd., Casselberry, FL 32707; 305-331-6402. ●

VEGA Deluxe Extra High Resolution Graphics Adapter

Video-7 has introduced the VEGA Deluxe, the extra-high resolution graphics adapter for IBM personal computers and compatibles. The VEGA Deluxe, a "short" card with the lowest IC count in the industry, offers 37% higher resolution than the standard IBM EGA. The VEGA Deluxe also supports all major industry graphics adapter standards, Monochrome Graphics Adapter (MGA), Color Graphics Adapter (CGA), Hercules Graphics Card (HGC) and Enhanced Graphics Adapter (EGA).

As an introductory offer, Microsoft windows will be made available with the VEGA Deluxe at no extra cost. "We at Microsoft are delighted that Video-7 chose Windows to accompany the VEGA Deluxe to market. The combination clearly demonstrates the benefits of increased resolution for software application packages such as ours," said Tandy Trower, Windows Marketing director.

"Video-7 led the industry with the VEGA, introduced in November of 1985 and setting the standard for EGA compatibility. We now continue that evolution with the extra high resolution of the VEGA Deluxe, which supports the next generation of monitors and software, while maintaining compatibility with current software," explained Paul Jain, president of Video-7.

High Resolution, Compatibility and Portability

In addition to the standard EGA resolution of 640x350, the VEGA Deluxe offers resolutions of 640x480 and 752x410 with a NEC Multisync(r) or equivalent monitor.

Like its predecessor the VEGA, the VEGA Deluxe includes software which enables the card to automatically select the right mode for emulation, so that the user will not have to think about changing modes once the program is up and running.

The VEGA Deluxe, a "short slot" graphics adapter, can be installed in any available slot of an IBM PC, PC/XT (including slot 8), PC/AT, or an IBM compatible.

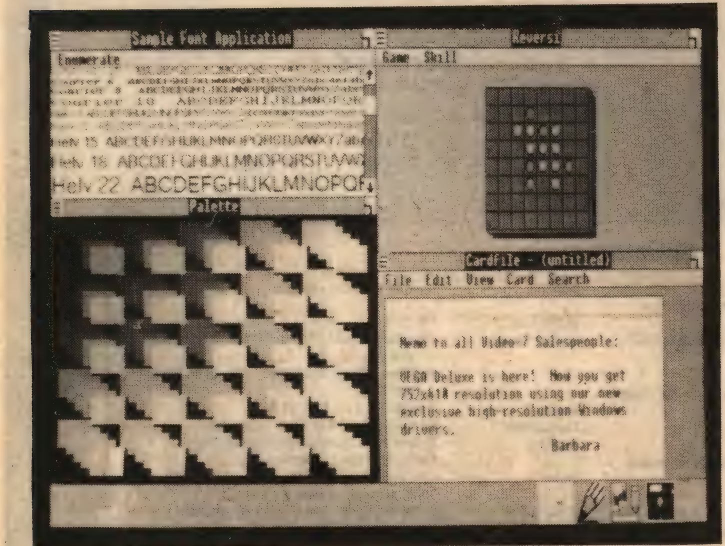
Ease of Use and Installation

The VEGA Deluxe includes easy to use menu-driven software to facilitate system configuration, as well as high resolution drivers for Microsoft Windows. Additionally, VEGA Deluxe software now enables the use of the graphics adapter with bootable, CGA-compatible games.

Proprietary Technology

Video-7's proprietary EGA Integrator chip and surface-mount technology gives the VEGA Deluxe the lowest IC count of any EGA board. The

continued on page 180


Sample Font Application
Enumerate
Helv 15 ABCDEFGHIJKLMNOPQRSTUVWXYZ
Helv 18 ABCDEFGHIJKLMNOPQRSTUVW
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Palette
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Cardfile - (untitled)
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Memo to all Video-7 Salespeople:

VEGA Deluxe is here! Now you get 752x410 resolution using our new exclusive high-resolution Windows drivers.

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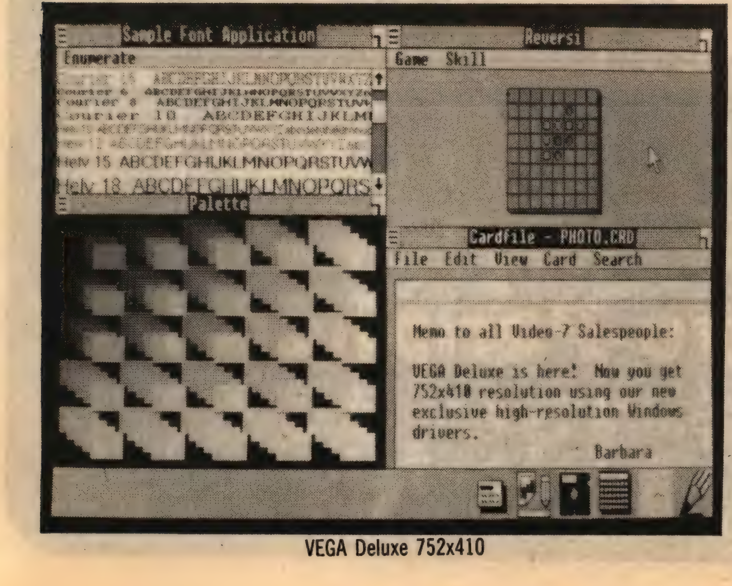
Standard EGA 640x350


Sample Font Application
Enumerate
Courier 6 ABCDEFGHIJKLMNOPQRSTUVWXYZ
Courier 8 ABCDEFGHIJKLMNOPQRSTUVW
Courier 10 ABCDEFGHIJKLM
Helv 15 ABCDEFGHIJKLMNOPQRSTUVW
Helv 18 ABCDEFGHIJKLMNOPQRS
Palette
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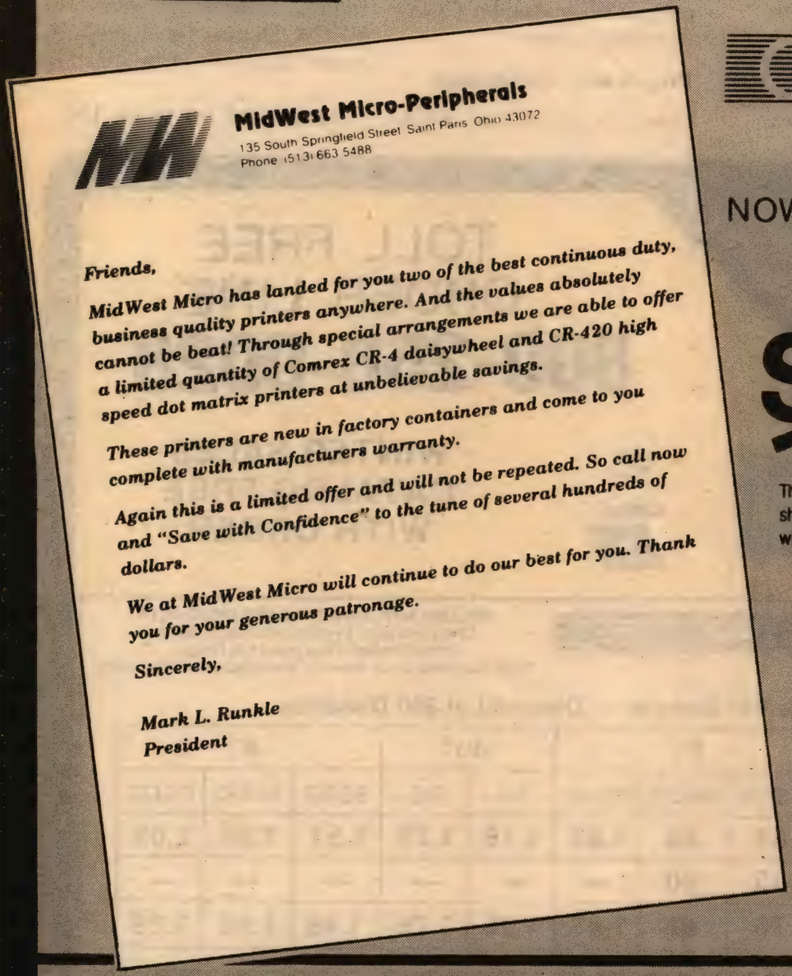

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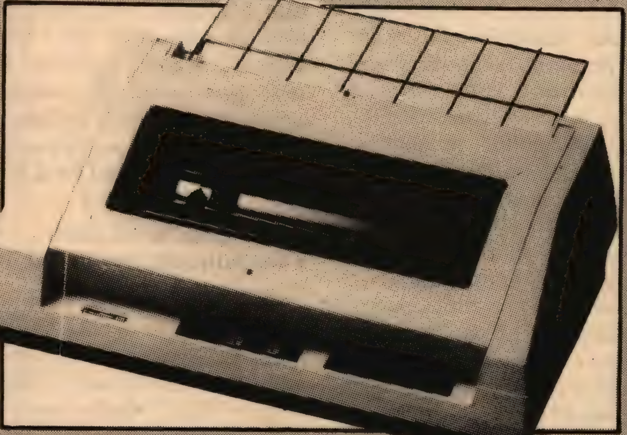

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SPECIFICATIONS

Carriage Width: 132 Columns (at 10 pitch)

Print Method: Impact dot matrix, bidirectional, logic seeking in both text and graphics

Print Speed: 420 CPS/Draft; 104 CPS/Correspondence Quality; 2500 dots/sec. – standard graphics; 1250 dots/sec – high-density graphics

Print Head: 8-pin, staggered arrangement

Character Sets: Standard 96 ASCII printing in 17 fonts

Line Spacing: n/180 (n=0-255)

Paper Feed: Pin feed (paper width adjustable) and built-in friction feed

Paper Width: 5" to 15" (pin feed); Up to 16" (feed)

Paper Path: Rear and bottom entry

Paper Thickness: Original plus 4 copies (5-part)

Ribbon: Cassette style, single color (black)

Interfaces: Parallel – Centronics-style; and Serial –RS232C Asynchronous

Baud Rate: 1200, 2400, 4800, 9600; switch selectable

Protocols: X-ON/X-OFF, READY/BUSY, ETX/ACK, switch selectable

Buffer: 18K

Reliability: MTBF – 800 hours continuous printing; MCBF – 200 million characters; MTTR – 30 minutes

Power: 117 VAC ± 10%, or, 220 VAC ± 10%, 50/60 H_z

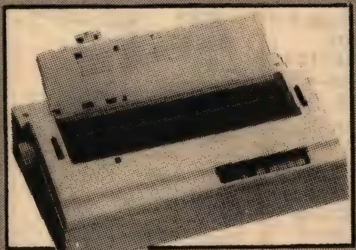
Power Consumption: 55W (Standby); 175W (Operating at self test print); 250W (Operating at heaviest duty)

Environmental Limits: Temperature (operating) 5°-40°C; 40°-105°F; Humidity (operating) 20-80%

Dimensions: 595mm (W) x 194mm (H) x 405mm (D); 23.4" (W) x 7.6" (H) x 15.9" (D)

Weight: 27kg; 60 lbs.

CR 420 Ribbon Cartridges $16.95



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- **Superior Performance**
- **Fast 36 CPS Print Speed**
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- **Continuous Duty Cycle**
- **Wide 16-5" Paper Carriage**

This bidirectional, logic seeking marvel lets you adjust the hammer intensity to print anything from single-page letters to five-part forms with equal clarity. A variety of impressive typestyles give you added print versatility.

It is exceptional in many other ways. The 15½" wide carriage briskly prints all your ledgers, spreadsheets, and extra wide business graphics with ease. With the optional cut sheet feeder and tractor feeder, you can print several copies on your letterhead and switch to pin-fed paper for high volume word or data processing.

The 7K buffer holds a substantial amount of data while its printing.

The average life of the print wheel is 10 million characters. Which means that you can run it eight hours a day — every day of the week — for almost two full years. Of course, under more normal usage, it will handle your business correspondence and graphics for up to five full years without service. That's impressive.

Quiet quality.
What your eyes don't tell you, your ears will. Because this printer is much quieter than many more expensive printers. So you can keep the noise down while you keep the cost down.

Specifications

Print Speed	36 CPS (Shannon text)	
Print Wheel	96 petals/wheel, cassette type, ASCII stand.	
Print Wheel Life	10 million char./wheel	
Characters/Line	132 characters (1/10"), 158 characters (1/2"), 198 characters (1/15")	
Paper Width	16.5 in max (419 mm)	
Copy Capacity	Original (45 kg) + 4 copies (15 kg) (total thickness 0.35 mm max.)	
Carriage Motion	Bidirectional, logic seeking	
Carriage Rtrn Speed	750 ms (at 13.2" return)	
Line Spacing	6, 4, 3 lines/inch, 1/48" proportional increments	
Paper Feed	Bidirectional, logic seeking	
Paper Feed Speed	4"/second	
Available Ribbons		Ribbon Life
	Single-strike black carbon film	60,000
	Multi-strike black carbon film	150,000
	Single-strike black correctable film	70,000
	Multi-strike black fabric	500,000
	Single-strike red film	2,000
	Correction tape	1,500

Interface	Standard RS-232C – Serial
Buffer Size	7K
Control Panel	Indicators: Select, Power, Alarm, Line, Pitch, and Copy (LEDs) Switches: Select, Line Feed, TOF, Line, Pitch, and Copy
Noise	Operating – Less than 65 dB
Temperature	50 to 105 F – 10 to 40 C (operating)
Humidity	20% to 80% non-condensing (operating) 5% to 90% non-condensing (storage)
Power	120 V, 60 Hz (Optional: 120 or 220 - 240 V, 50/60 Hz) 130 W Max.
Dimensions	21.18 (W) x 7.65 (H) x 15.15 (D) inches (538(W) x 194.5 (H) x 385 (D) mm)
Weight	33 lbs (15 kg)
Optional Features	Tractor feeder, Auto Cut Sheet Feeder, Single and Multi-strike ribbons, Interchangeable printwheels (Numerous languages and typestyles)

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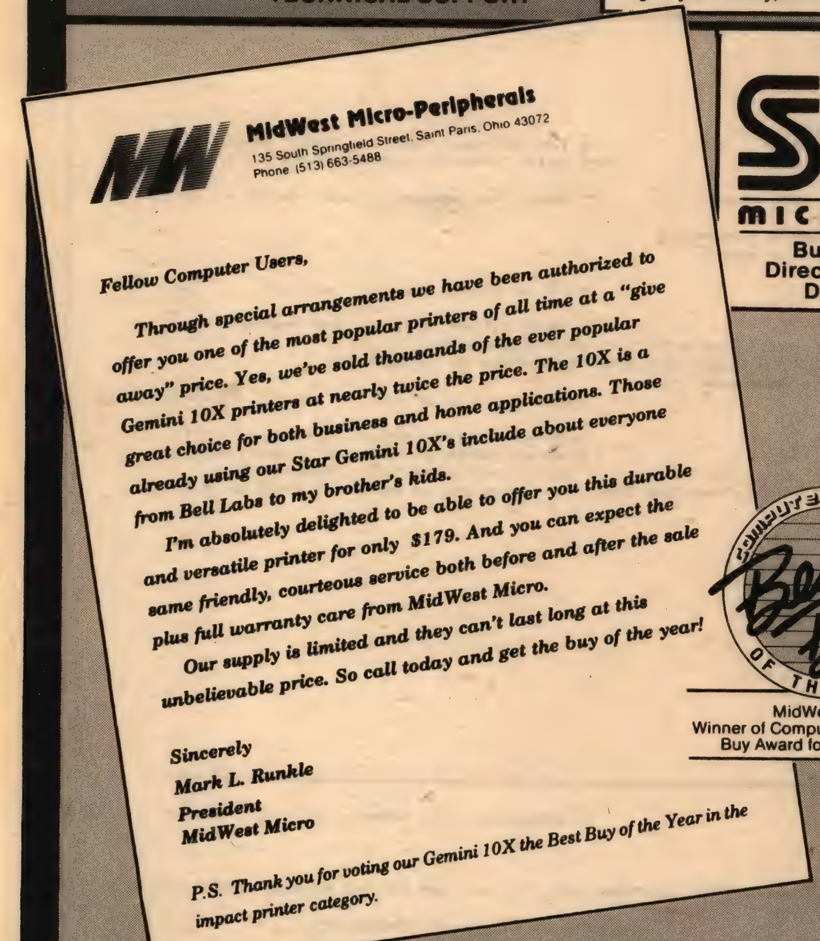

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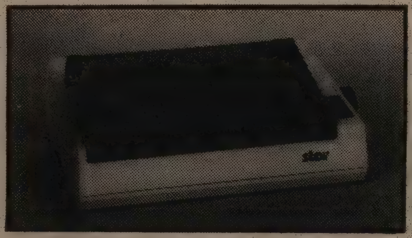

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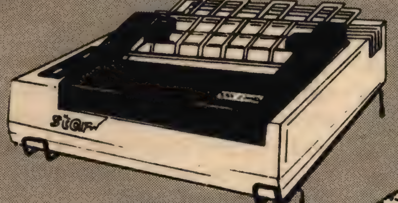

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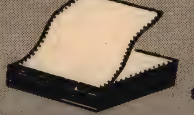

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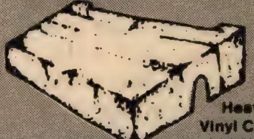

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LV-1210 (120 cps, 80 Col, IBM Mode)	$299	$CALL$
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Lightning

continued from page 170

released in 1986. Weighing in at just a tad under 8K, Lightning is small, fast, easy to use and bulletproof. If you are one of the unfortunate few still shuffling diskettes, Lightning should be the second program you purchase; DOS should be the first.

The software house that created this utility, the Personal Computer Support Group, entered the market around three years ago. Their original products were all centered around the laptop market (Model 100). Lightning, which was just released in October, is their first product aimed at the PC market.

I tested the Lightning program using an 8 mhz AT clone equipped with a high speed Seagate 39 ms access hard disk. Even with this combination of big time hardware, I was still able to improve my overall disk access with Lightning.

Since Lightning immediately writes all new information directly to the default drive, there is no threat of data loss from either a power failure or a hung system. It's like having a nonvolatile RAM disk!

Personal Computer Support Group sells Lightning in two versions—one version is copy protected and lists for $49.95 while the second version is an unprotected version which lists for $89.95. Since I won't purchase, use or review copy protected software, the only package I would consider to purchase would list for $90.

I guess that copy protection seems natural for a company accustomed to the creation and sale of ROM based software.

As utility programs go, Lightning is a worthwhile investment at the $50 price however a little pricey at the $90 price. It's too bad the otherwise flawless program is blemished with copy protection. Perhaps PCSG will rethink their marketing strategy and sell the unprotected version for $50. If so, Lightning will surely become a top seller in a matter of months.

For additional information contact: Personal Computer Support Group, 11035 Harry Hines Blvd. #206, Dallas, Texas 75229, (214) 351-0564 ●

C.Itoh 333-CPS, 24-Pin Dot Matrix Printer

C.Itoh Electronics, Inc. has introduced a new 24-pin, high-speed dot matrix printer that features a 333 cps draft mode and a proprietary 24-pin diamond-shaped head at Comdex/Fall '86, in Las Vegas, Nev.

The new 9815, which emulates the IBM ProPrinter XL, the Toshiba P351 and Qume Sprint 11 printers, targets the high-end of the dot matrix market which requires a single printer to perform as a line printer for high-speed data processing and a daisy wheel for letter quality output.

The 9815, printing at 10 pitch and 12 pitch respectively, has a 333/400 cps draft mode and a 135/162 cps letter quality (LQ) mode.

The 9815's unique 24-pin diamond-shaped head uses LSI gate array technology to individually control the firing of each 0.2mm pin, resulting in lower power consumption and noise levels, and increased reliability versus conventional 24-pin heads arranged in two 12-pin rows.

The 9815 has a dot resolution of 180x360 dots per inch, a low noise level of 56 dBA in draft mode, and a head life projected at 400 million dots per wire.

Additional features of the 9815 printer include a 136-column width, bi-directional graphics, user-programmable font cartridges, standard parallel and serial interfaces, and a high-speed 8.3-inch per second paper feed.

The 9815 is equipped with 12 national character sets, eleven of which are pre-set with the user able to select and assign the remaining set from the resident character sets.

An optional download front card and Font Master software allow the user to create logos and stylized typefaces which can then be saved permanently on the font card.

A pull-type tractor feed is standard with a bi-directional tractor, and single and dual automatic sheet feeders available as options.

Weighing 33 pounds, the 9815 measures 6.25 inches high x 22.75 inches wide x 15.5 inches deep.

The 9815 dot matrix printer has a single-unit price of $1995, with quantity discounts available.

The 9815 complements C. Itoh Electronics' 9700 24-pin color printer, introduced this past June, which has a 250 cps draft mode and 100 cps LQ mode.

For more information contact: C. Itoh Electronics, Inc. 19300 South Hamilton Avenue, Torrance, CA 90248, 213-327-9100.

Mention that you read about it in *Computer Shopper*. ●

Program For Lightning Article

```
/*****************************************************************************/
/***                                                                       ***/
/***        A UTILITY PROGRAM TO PROVIDE INTERRUPT VECTOR LISTINGS         ***/
/***             ALSO LOCATES OPTIONAL ROMS INSTALLED IN SYSTEM            ***/
/***                                                                       ***/
/*****************************************************************************/

#include <string.h>
#include <stdlib.h>

struct vector {                            /* global structure to store vectors */
  unsigned int seg;
  unsigned int off;
} interrupt[256];                          /* global array of actual vectors    */

/*****************************************************************************/

main(argc,argv)
int argc;
char *argv[];
{
  int num,trgt1,trgt2;
  unsigned int far *ptr;                   /* far pointer used to "peek" memory */
  void listgrp(),listall();                /* void function declarations        */

  for(num=0; num <= 255; num++) {          /* begin by reading in all vectors   */
    ptr = num * 4;
    interrupt[num].seg = *(ptr+1);
    interrupt[num].off = *ptr;
  }
  if (argc == 1)                           /* if no args, list all vectors      */
    listall();
  else if (argc == 2) {                    /* need either help or one vector    */
    if ((! strcmpi(argv[1],"help"))||(! strcmpi(argv[1],"?"))) {
      puts("\nINTERRUPT - Copyright 1986 by Andrew M. Fried\n");
      puts("Available Commands :\n");
      puts("\"INT\"                         print listing of all interrupt vectors t
o STDOUT.");
      puts("\"INT n\"                       display single vector (n=decimal).");
      puts("\"INT n n\"                     display range of vectors (n=decimal).");
      puts("\"INT ?\" or \"INT help\"         print out this help listing.");
      puts("\nNOTE: You may use the DOS \">\" command to redirect program output
.");
    }
    else {
      trgt1 = atoi(argv[1]);
      listgrp(trgt1,trgt1);
    }
  }
  else if (argc == 3) {
    trgt1 = atoi(argv[1]);
    trgt2 = atoi(argv[2]);
    listgrp(trgt1,trgt2);
  }
}

.pa
/*****************************************************************************/

void listall()                             /* produces full vector listing      */
{
  int num,r1,r2,r3;

  puts("        INTERRUPT VECTOR LISTING UTILITY for IBM PC and MS-DOS Compatible
s");
  puts("                              (c) 1986 by Andrew M. Fried\n");
  for(num=0; num < 85; num++) {
    r1 = num * 3;
    r2 = r1 + 1;
    r3 = r2 + 1;
    printf("%03d [0x%02X] %04X:%04X         %03d [0x%02X] %04X:%04X         %03d [
0x%02X] %04X:%04X\n",
      r1,r1,interrupt[r1].seg,interrupt[r1].off,
      r2,r2,interrupt[r2].seg,interrupt[r2].off,
      r3,r3,interrupt[r3].seg,interrupt[r3].off);
  }
  printf("%s%03d [0x%02X] %04X:%04X\n",
    "                          ",
    255,255,interrupt[255].seg,interrupt[255].off);
  romcheck();                              /* locate any rom signatures         */
}

/*****************************************************************************/

void listgrp(start,stop)
int start,stop;
{
  int loop;

  puts("\nINTERRUPT - Copyright 1986 by Andrew M. Fried\n");
  if ((start<0)||(stop>255)||(start>stop))
    puts("Vector out of range! Program aborted...\n");
  else
    for(loop=start; loop<=stop; loop++)
      printf("%03d [0x%02X] %04X:%04X\n",loop,loop,interrupt[loop].seg,interrupt
[loop].off);
}

.pa
/*****************************************************************************/

romcheck()
{
  int count = 0;
  unsigned long memloc;
  unsigned int far *ptr;

  for (memloc=0xC8000000; memloc <= 0xF4000000; memloc+=0x800000) {
    ptr=memloc;
    if (*ptr==0xAA55) {
      count++;
      printf("\nROM Bios Signature found at %04lX:%04lX...\n",memloc>>16,memloc&
0xFFFF);
    }
  }
  if (count == 0)
    puts("\nNo ROM BIOS signatures found in memory from C800:0000 to F400:0000.\
n");
  else
    printf("\nROMCHECK located a total of %d ROM signature(s).\n",count);
  return(count);
}

/*****************************************************************************/
```

Arabic/English/French Word Processor

Software that converts an IBM-PC or compatible personal computer into an advanced Arabic/English/French word processor with graphics capabilities has been introduced by Computers Anyware, Inc., McLean, VA.

Arabic/English/French "Interword" lets users write in either language or combine all three on screen or printed page—even in a single paragraph or line. It also can enhance a document with straight-line graphics. Switching between languages is done with a single keystroke, without changing diskettes.

The software is designed to simplify professional production of trilingual documents in varied formats. It offers in a single package the equivalent of four word processors: Arabic, English, French, and trilingual. A Farsi/English /French version also is available.

The products are two of a series of multilingual systems for IBM-PCs or compatibles, all the culmination of several years of development. A bilingual version of Interword converts an IBM-PC compatible into an advanced Russian/English word processor.

Multilingual Interword, lets users display, edit, and print text in 11 languages: Danish, English, Finnish, French, German, Icelandic, Italian, Norwegian, Portuguese, Spanish, and Swedish.

A fifth version, Latin Languages Interword, lets the writer edit and print any combination of English, French, German, Italian, and Spanish. All Interword versions have linear graphics.

The Need For Multilingual Word Processing

Speaking of the need for multilingual word processing, Samir Amer, president of Computers Anyware, said "Technology and computers are rapidly uniting countries and cultures. Corporations, diplomatic posts, government offices, information services, and others active internationally have needed a software programming breakthrough that would provide fast, effective multilingual word processing.

"Present PC/DOS word processing software will not generate professional-quality text in more than one language within a single document. So we developed Interword to permit switching from language to language with a single keystroke."

Amer said those communicating in two or more languages also include: consulates, export-importers, shippers, scientists, health care professionals, the military, teachers, scholars, publishers, travel agents, financial institutions, and many others.

With Arabic/English/French Interword, Arabic and French words and letters can be inserted into English text and vice versa. The insert mode automatically shifts characters in the right direction without having to position the cursor prior to inserting text. Versatile cut & paste functions let users define and cut out length or width of text for repositioning in document segment or file. Text in any language combination can be formatted in multiple vertically-justified or ragged-right columns or may be divided horizontally in the desired screen width.

continued on page 184

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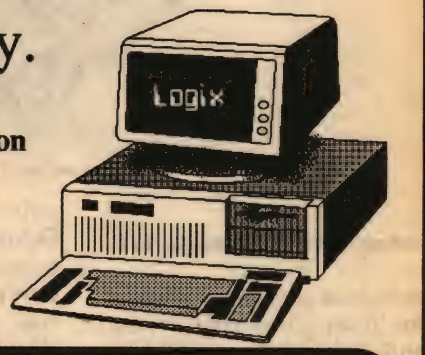

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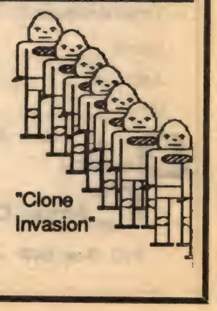

"Clone Invasion"

VEGA Deluxe Board

VEGA

continued from page 175

reduction of chip count allows for lower power consumption and reduced heat build-up, making for long-term reliability. As with other Video-7 products, the VEGA Deluxe comes with a limited two-year warranty.

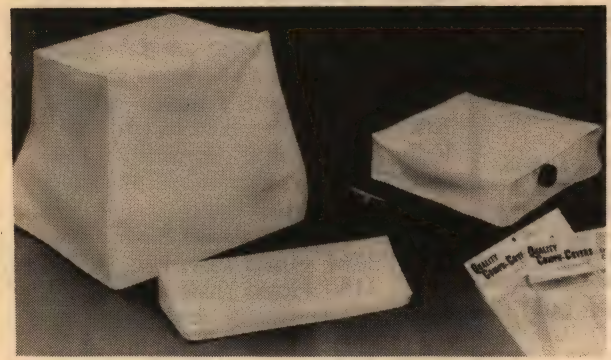
Pricing and Availability

Available now through leading distributors and computer retailers, the VEGA Deluxe has a suggested retail price of $599. For a limited time only, Microsoft Windows will be packaged with the VEGA Deluxe at no additional charge.

Video-7 will continue to ship the original VEGA product at a reduced suggested retail price of $549.

For more information contact Video-7, 550 Sycamore Drive, Milpitas, CA 94025.

Mention that you read about it in *Computer Shopper*. ●



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1-87

One Adapter—One Monitor "Graphics Solution"

Mylex Corporation is now shipping its Enhanced Graphics Adapter (EGA) with a unique new feature not available on other EGA boards.

The Mylex EGA comes standard with 256k of memory and is MDA, CGA, EGA and Hercules compatible. In addition, the Mylex EGA has the ability to display the Hercules graphics mode on monitors compatible with the NEC Multisync Color Monitor. Other EGA boards currently in the marketplace, require a separate monochrome monitor to display the Hercules mode. The Mylex EGA provides a unique hardware/software feature that simulates the Hercules mode. This means that any software that has the ability to run Hercules graphics, will run when used with the Mylex EGA and NEC Multisync combination.

"The Mylex EGA is compatible with all enhanced color monitors, but when used with the Multisync, users can still utilize the high resolution 720x348 Hercules mode and do it with one monitor. This eliminates the dual monitor configurations currently being used," said John Baiocchi, vice president of Marketing at Mylex. "This one adapter-one monitor combination is truly a graphics solution," he added.

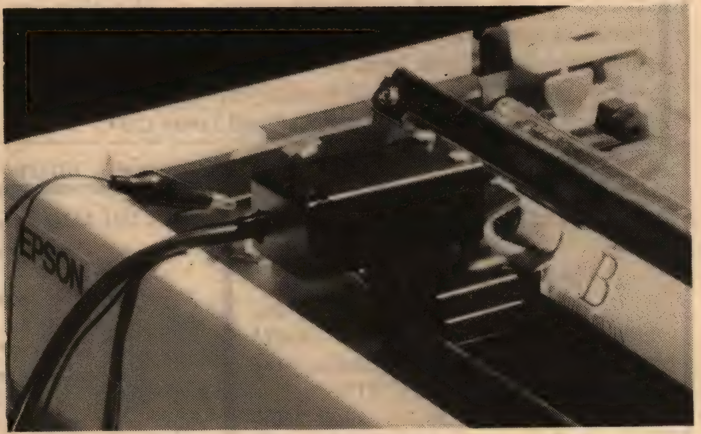
The Mylex EGA is supplied with a proprietary software package, "The Mylex Character Editor" that enables the user to create, edit and store custom character sets for applications such as foreign languages, Scientific/Engineering symbols and object oriented graphics.

The Mylex EGA retails for $495.00 with corporate, dealer and distributor discounts available.

For more information contact Mylex Corporation, 5217 N.W. 79th Avenue, Miami, Florida 33166; (305) 592-9669.

Mention that you read about it in *Computer Shopper*. ●

Low Cost Scanner For PC



PC Low Cost Scanner

A low cost IBM-PC compatible image scanner has been announced by E. Arthur Brown Company of Alexandria, MN. PC-PictaScan attaches to the printhead of Epson FX-80/85 printers and uses the print mechanism to feed and scan line art and photographs from paper. Once captured to the IBM-PC screen, images can then be touched-up, modified, or enhanced with paint-type graphics software and incorporated into desktop publishing applications. Presently, PC-PictaScan supports PC-Paintbrush, Dr. Halo, PC-Paint, and all desktop publishing programs that accept graphic files from those programs. The suggested retail price is $149.95.

For more information contact E. Arthur Brown Company, 3404 Pawnee Drive, Alexandria, MN 56308; 612/762-8847. ●

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RAM-Resident, PrintMerge Program For Desktop Publishing

Polaris Software has introduced its Ram-Resident Printmerge desktop publishing software for use with IBM PC or fully-compatible microcomputers and Hewlett-Packard LaserJet, LaserJet PLUS or fully-compatible printers. The software utility is capable of capturing not only graphics from a microcomputer's screen, but also graphic output from virtually any graphic program, able to print to a LaserJet or compatible printer, and place the graphics within text created by any other program.

Polaris Software's new desktop publishing package can store nine different printer configurations. A user is also able to draw vertical or horizontal lines, boxes and (with the LaserJet PLUS) previously stored forms overlays. Tabular columns can be aligned with proportional fonts with perfect right/left justification.

Any combination of cartridge or downloadable fonts can be used and changed within the document. Ram-Resident PrintMerge, can print graphic images from the screen in four different resolutions and sizes. The software also prints from any program, using a program's inherent capabilities for maximum clarity and resolution in output.

Ram-Resident PrintMerge extends the capabilities of the San Diego area-based company's family of publishing programs—Polaris PrintMerge, Polaris LabelMaker, and Polaris Forms: "to fill the entire spectrum of software capabilities for the LaserJet, LaserJet PLUS and compatible printers and, thereby, satisfy just about all possible user desktop publishing needs," says Polaris Software's president, Jack Leach.

"Ram-Resident PrintMerge is a capabilities-packed program that takes full advantage of and brings to life the true potential of LaserJet and compatible printers," says Leach.

Can Draw Horizontal/Vertical Lines, Boxes and Shapes

User, at their IBM PC or compatible microcomputers, can emphasize text and graphics by drawing horizontal or vertical lines, boxes, shapes and symbols in any document, from any program. "These elements will 'float' on the page or onto different pages, to maintain their proper position should text be added or deleted above them," says Leach.

Likewise, graphic output of charting and mapping programs can be merged into documents from any program that can print on the LaserJet or LaserJet PLUS printers, similarly "floating" on a page to maintain their proper position.

Prints Directly From Any Program/Up to 9 Different Printer Configurations

Ram-Resident PrintMerge can be loaded automatically when booting the system, remaining in the "background mode" until the users needs it. The software utility prints directly from virtually any word processing, spreadsheet or database program: from DisplayWrite 3, Microsoft Word, Multimate, WordStar and WordPerfect to Lotus 1-2-3, Symphony, Framework; R-base 5000, dBase II and III, to name only a few.

Users can set up page parameters in advance by configuring their LaserJet or compatible printers with up to nine "setup screens," each screen storing a different printer configuration. Says Leach, "This enables users to easily specify such things as type of page, length of text, character width, vertical spacing, page breaks and left, right, top or bottom margins."

He says users can "pop up" the main screen, from within a document, and send the desired configuration to the LaserJet printer and then print the document with whatever application program the user happens to be working in.

Any Combinations of Cartridge or Downloadable Fonts/True Proportional Spacing and Justification

Ram-Resident PrintMerge can use any combination of cartridge or downloadable fonts that can be changed any number of times, anywhere in the document. Users of LaserJet PLUS can use downloadable fonts from Hewlett-Packard, VS Software or Softcraft's Laser Fonts.

Regardless of type of fonts used and no matter how many are used per line, Ram-Resident PrintMerge performs true porportional spacing with perfect right/left justification. Polaris Software's product can also make any program print tabular columns using proportional fonts, with easy-to-add commands. Users can also specify line length and paragraph formatting at the time a document is printed.

"This ensures text is printed with the maximum number of characters on each line and printed to the specified line length, even with DisplayWrite 3 and Multimate," says Leach.

Any graphic data sent to a LaserJet or compatible printer can be stored in a file for later merging into a different document, enabling a user to capture large graphic images from many graphic programs. "The size of the image sent to the printer is reduced by our Polaris Crunch special utility and the results merged into other documents," says Leach.

Any image displayed on a user's microcomputer screen can be printed in four different resolutions and sizes, or printed in reverse (white as black and black as white.) Or, the displayed image can be stored in a file for later merging. Once in a file, the graphic can be rotated, cropped and compressed by using the Polaris Crunch.

Irrespective of the data coming in, users can create typeset-quality reports by specifying, one time only through page headers, the print style and format for each page. "One particularly interesting feature is the ability to format and print Lotus 1-2-3 spreadsheets," says Leach. "An often-used spreadsheet can have graphics merged directly into it and, together with proportional fonts, can be printed as a truly professional, typeset-appearing document."

Ram-Resident PrintMerge supports all shading and patterns available with the LaserJet PLUS printer. The software also provides for automatic overlay macros which call up the data—such as a form created by Polaris Forms and stored in the LaserJet PLUS printer—for merging and printing into documents.

According to Leach, Ram-Resident Print-Merge complements user's existing programs. "There is very little new to learn in formatting and printing," says Leach. "The results, however, will be very noticeable."

Price And Availability

Ram-Resident PrintMerge, carrying a 30-day money back guarantee, is available immediately from authorized dealers or direct from Polaris Software; price per copy is $149.

To operate Ram-Resident PrintMerge, users must have PC or MS/DOS, with 64K bytes of memory, IBM PC, XT, AT or 100 percent-compatible micro; and a LaserJet, LaserJet PLUS or 100 percent-compatible laser jet printer.

For further information contact Polaris Software, 310 Via Vera Cruz, Ste. 205, San Marcos, CA 92069; 619/471-0922.

Mention that you read about it in *Computer Shopper*. ●

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PRINTER MAKE, MODEL NUMBER Contact us if your printer is not listed. We have many more in stock. We can probably RELOAD your old cartridges.	RIBBON SIZE Inches by Yards	NEW CARTRIDGES From the various manufacturers or made in our own shop. Ready to use.			RELOADS You SEND your used CARTRIDGES to us. WE put OUR NEW INSERTS in them.			INSERTS EZ-LOADtm DROP IN, NO WINDING! EXACT REPLACEMENTS made in our own shop. Cartridges NOT included.		
C ITOH Prowriter 1550-8510, NEC 8023-8025, APPLE DMP-IMAGEW	1/2 x 18	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
IBM PROPRINTER (Standard Paper) (4201)	7/16 x 20	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$18/3	$66/12	$360/72
PC (Standard Paper) (5152)	1/2 x 20	$14/2	$36/6	$ 66/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
RADIO SHACK-TOSHIBA-COMMODORE-PANASONIC-RICOH		RS LP-I-II-IV, CENTRON			730-737-739-779 (Zip Pack)			$12/3	$45/12	$252/72
Carbon Film - DWP 210, DIABLO HYTYPE II Black (1445)	5/16 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1419)	1/4 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
Red, Green, Blue, Brown Colors (1419)	1/4 x 130	$21/3	$72/12	$414/72	$6 ea 3-11	$5 ea	12 or more	$30/6	$54/12	$234/72
Fabric (Long Life), DWP 210, DIABLO HYTYPE II Black (1458)	5/16 x 17 NOT EZ LOAD 1/4 x 25	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$21/3	$78/12	$432/72
DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1449)		$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$21/3	$78/12	$432/72
DMP-100, LP VII, COMMODORE 1525, GORILLA BANANA (1424)	Inker Loop	$18/2	$51/6	$ 96/12	--------------------			--------------------		
DMP-200, 120, (430 Inserts & Reloads Only) (1296) (1483)	1/2 x 20	$20/2	$57/6	$108/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
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DMP-500 (130 Inserts & Reloads Only) (1236) (1482)	1/2 x 20	$22/2	$63/6	$120/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
DMP-2100, TOSHIBA P1340-1350-1351-351 (1442)	1/2 x 20	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
DMP-2200, C ITOH 3500 (1233)	1/2 x 52	$35 each			$18/1	$16 ea	2 or more	$30/3	$57/6	$108/12
LP III-V, CANON A 1200 (New Only) (½ x 5) (1414)	1/2 x 15	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
EPSON LQ 1000	1/2 x 18	$22/2	$63/6	$120/12	$8/1	$7 ea	2 or more	$18/3	$66/12	$360/72
MX-FX-RX 70-80-85, LX 80-90 (5/16 x 7)	1/2 x 20	$14/2	$36/6	$ 66/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
MX-FX-RX 100-185-286, LQ 800 (1/2 x 18) LQ 1500 (1/2 x 14)	1/2 x 30	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$18/3	$66/12	$360/72
DX 20-35 Carbon Film (Multistrike), OLIVETTI ET-121-221	5/16 x 290	$21/3	$72/12	$414/72	(Call for Correctable Prices)			--------------------		
NEC Spinwriter-Carbon Film - 2000-3500 (Reloads BCCOMPCO Only)	5/16 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
- 5500-7700 (Can Reload Most Types)	NOT EZ LOAD 1/4 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
-Fabric - 2000-3500 (Can Reload All)	1/2 x 14	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$15/3	$54/12	$288/72
- 5500-7700 (Can Reload All)	1/2 x 13	$15/2	$42/6	$ 78/12	$8/1	$7 ea	2 or more	$15/3	$54/12	$288/72
Pinwriter P1-P2-P6, P-5 (1/2 x 14)	1/2 x 20	$25/2	$69/6	$126/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
P3-P7	1/2 x 27	$30/2	$84/6	$156/12	$8/1	$7 ea	2 or more	$18/3	$66/12	$360/72
OKIDATA Pacemark 2350-2410 Black	1/2 x 100	$25 each			$20/1	$18 ea	2 or more	$36/3	$132/12	$720/72
Microline 182-183-192-193 (Call for 292-293 prices)	Inker Loop	$20/2	$57/6	$108/12						
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MANNESMAN-TALLY MT-160, RITEMAN INFORUNNER (Inker Loop)	9mm x 11	$19/2	$54/6	$102/12						
MT-180-290	9mm x 13	$20/2	$57/6	$108/12						
-SPIRIT 80 (SP80) COMMODORE 1526 (Multistrike)	1/2 x 35	$16/2	$45/6	$ 84/12						
PANASONIC KXP-1080-1090-1091-1092-1592-1595	Inker Loop	$20/2	$57/6	$108/12						
BROTHER HR-15-25-35 Carbon Film (Multistrike)	5/16 x 82	$18/3	$60/12	$342/72						
COMREX DX-15, II Fabric (Call for Comrex 420 Prices)	5/16 x 17	$15/2	$42/6	$ 78/12						

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PC Informational Help Program

Polaris Software has announced Polaris Rescue, a unique, on-line RAM-resident tutorial help program which enables users to develop their own on-line help screens for any application or business procedure. Polaris Rescue can be used alone or with any applications program for IBM PC and 100 percent-compatible microcomputers. "Our new RAM-resident utility software enables any department head or small business owner to easily create and maintain help screens on the department's or company's operating procedures, that will significantly increase the productivity of all employees authorized to access any or all portions of the program," announced Jack Leach, Polaris Software's president.

Polaris Software, Escondido-based (San Diego area) developer of desktop publishing programs for IBM PC and compatible micros, has expanded its software offerings to now address the entire world of PC and compatible users. The company is determined to increase the productivity of these users, anyone who needs on-line instructions in order to perform any task or any application— from accounting and payroll to shipping and receiving.

"We offer users a fast, efficient way to tie together all hardware, software, applications and procedures used in their day-to-day business," says Leach, "so that new employees or anyone who does not run an application frequently can have, at their fingertips, step-by-step directions in how each task should be accomplished.

"Studies indicate that it is not clear whether the personal computer's goal, as a tool to help people to be more productive, has been entirely successful," says Leach. "One reason a person's overall productivity has not been improved lies in the nature of the computer itself."

According to Leach, a computer requires a user to be precise when requesting it to perform a task. Unless a person is technically oriented and uses a computer every day, details in how to do specific tasks are forgotten, "and the user must waste time ransacking through the hardware and software documentation," says Leach.

Polaris Rescue—Ties Together All User Applications And Procedures

Polaris Rescue is divided into two parts: a full-screen editor and the RAM-resident (taking up only 33KB of RAM) portion of the program. The editor is used to design and maintain the help screens; connect one screen to another; and to assign the function keys and user-defined labels and functions. With the help of this editor, a user sets the path by which each screen pointer is connected to other screens and help files. Each screen can have up to 30 pointers to other screens.

The editor can use all of the IBM extended screen characters. "If a user wants to build a screen from an existing ASCII file in an application program, we will input it into the editor file without the user having to re-type the information," says Leach.

The RAM-resident second portion of the Polaris Rescue program resides in the computer's main memory until a user-defined key sequence is pressed which displays the first screen of the user's help function. When the local users have

continued on page 186

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MaxTech

AT&T Announces New PC Plus Model

AT&T now has a new 40MB hard disk model of its AT&T PC 6300 Plus personal computer that offers greatly increased capacity and improved performance.

With the 40MB hard disk, the PC 6300 Plus has an access time 36 percent faster than the nearest 80286-class machine, and it is now the price-performance leader among major vendors, according to AT&T.

Combined with the high-speed processing technology of the PC 6300 Plus, the fast-access 40MB hard disk drive enables the Plus to provide extraordinary performance in hard disk, memory intensive applications, such as local area network (LAN) servers, computer-aided design/computer-aided manufacturing (CAD/CAM) and large databases.

The 40MB hard disk also increases the amount of storage available for desktop publishing and Simul-Task applications. The Simul-Task feature on the PC 6300 Plus allows a user to simultaneously run UNIX and MS-DOS operating systems. The 40MB model is configured with a 1.2MB floppy disk drive and 512KB RAM. It is available now for $4800, excluding keyboard and monitor.

AT&T also offers single floppy, dual floppy and 20MB hard disk models of the PC 6300 Plus.

For additional information contact AT&T, 1200 Peachtree Street, N.E., Atlanta, GA 30357.

Mention that you read about it in *Computer Shopper*. ●

Word Processor

continued from page 179

A contextual analysis feature, specially designed for the Arabic/English/French and Farsi/English/French versions, selects automatically the correct form of Arabic or Farsi letters.

Graphics Capabilities

By touching a function key, Interword turns PC/DOS computers into graphics machines permitting addition of graphics characters to the text of any language or language combination. Press the F-9 function key and any other key touched will display a graphic character on screen or printed page.

Interword can create simple and shaded bar charts and line graphs; horizontal and vertical rules and dividers; linear frames and outlines for columns, sections, and blocks of copy; and tables of organization based on lines and rectangles.

Printed Output

For type variations, Interword can direct a dot matrix printer to produce type in small, medium, large, double-width, or condensed fonts or in underlined text.

Interword's printing routines are compatible with dot matrix, laser, and daisy wheel printers. Full use of Interword's features requires a printer with downline loadable character capability or a daisy wheel compatible with Interword's ASCII code table.

Arabic/English/French and Farsi/English/French Interword are designed to run on an IBM-PC, XT, or AT or compatible MS/DOS computer with 128K memory, two disk drives or a hard disk system. Also required is a color or monochrome monitor driven by a board having a character generator compatible with one of Interword's character generators. Suggested retail price is $495.00.

An EPROM computer chip enclosed with Interword software must be installed on the IBM-PC or compatible in order to use the Arabic/English/French, Arabic/Farsi/French, Arabic/Russian or Multilingual versions of Interword.

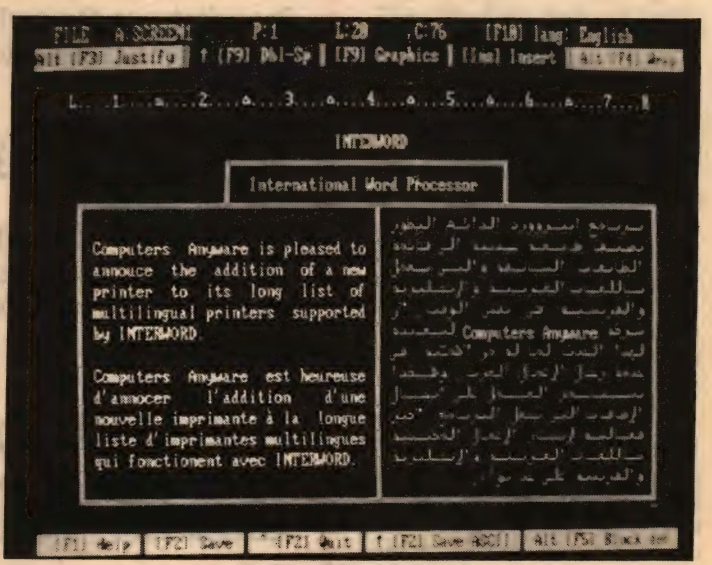
Each Interword package (except Latin Languages) contains a program diskette, printer routines diskette, keyboard overlays, English user's manual, and EPROM chip programmed with the proper English, foreign language, and graphics characters. An Arabic manual is provided with the Arabic/English/French version. Future products planned by Computers Anyware include multilingual word processing software for additional language combinations, a spreadsheet, and multilingual database applications.

Latin Languages Interword has a program diskette, keyboard overlays, and English user's manual. Suggested retail: $395.00.

Computers Anyware, Inc., in McLean, VA, designs, develops, and markets multilingual word processing software and related products for the international and domestic marketplace.

For more information contact Computers Anyware, Inc., 8200 Greensboro Drive, #304, McLean, VA 22102; 212-986-6668.

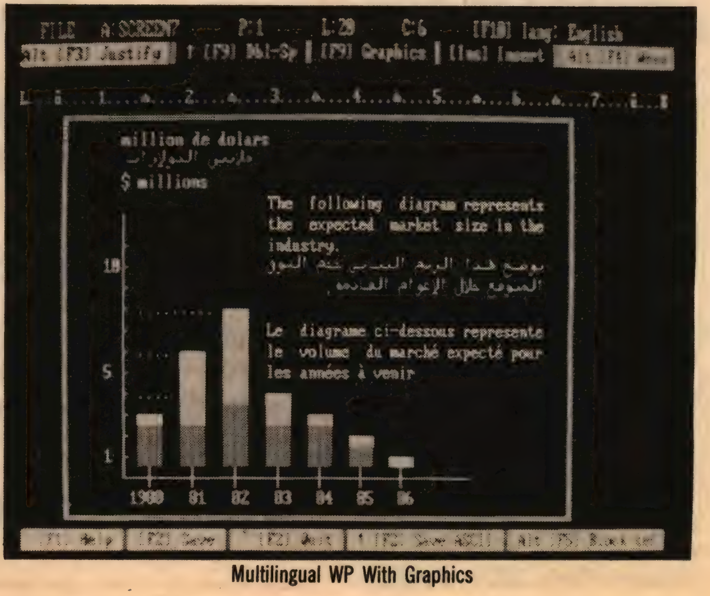
Mention that you read about it in *Computer Shopper*. ●


FILE A:SCREEN1 P:1 L:20 C:76 [F10] lang: English
Alt [F3] Justify | ↑ [F9] Dbl-Sp | [F9] Graphics | [Ins] Insert
INTERWORD
International Word Processor
[F1] Help | [F2] Save | ^ [F2] Quit | ↑ [F2] Save ASCII | Alt [F5] Block

Computers Anyware is pleased to annouce the addition of a new printer to its long list of multilingual printers supported by INTERWORD.

Computers Anyware est heureuse d'annocer l'addition d'une nouvelle imprimante à la longue liste d'imprimantes multilingues qui fonctionent avec INTERWORD.

Multilingual Word Processor


FILE A:SCREEN7 P:1 L:20 C:6 [F10] lang: English
Alt [F3] Justify | ↑ [F9] Dbl-Sp | [F9] Graphics | [Ins] Insert
million de dolars
$ millions
10
5
1
1980
81
82
83
84
85
86
[F1] Help | [F2] Save | ^ [F2] Quit | ↑ [F2] Save ASCII | Alt [F5] Block

The following diagram represents the expected market size in the industry.

Le diagrame ci-dessous represente le volume du marché expecté pour les années à venir

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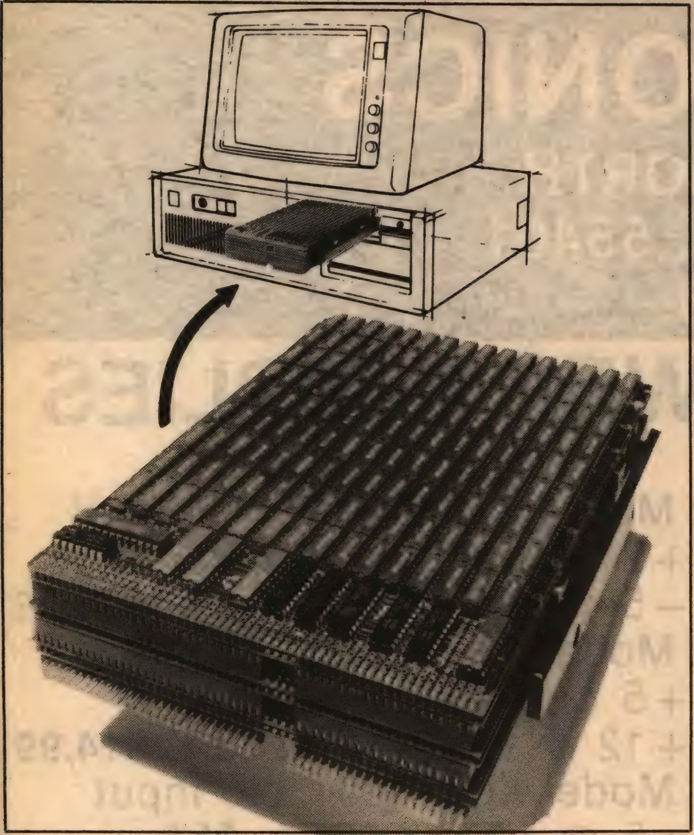

Internal Solid State Memory System Boasts 80386 Compatibility & Ultra-High Access Speed

Newer Technology has introduced a new internal solid state memory system which eliminates the need for bulky external devices and dramatically increases performance on existing 8088, 80286 and 80386 based PCs. DART, which is installed in a disk drive slot, provides either ultra-high capacity RAM expansion or high-speed mass storage. As RAM expansion, DART achieves significantly higher memory capacities than other available systems at a much lower cost per megabyte. When used as hard disk storage, it increases access time by a factor of up to 5,000 and increases data transfer rates five to 10 times.

"The DART system represents a new generation of high capacity and high performance peripherals for personal computers and network environments," James Wiebe, president of Newer Technology said. "We've designed it to take advantage of the 80386 capabilities. With DART, we have overcome the obvious limits and high cost of current memory expansion systems. The DART system is ideal for network file servers, engineering workstations and any personal application where high-speed disk performance is crucial."

DART uses a modular, ultra-high density semiconductor array to expand memory in increments of eight or 32 megabytes within a single internal unit. Models range in capacity from eight to 192 megabytes in 5¼" half-height and full-height versions. Low-power design eliminates need for internal cooling fan in both regular and standby modes.

Controllers are available in several versions, including PCBUS-based (resides in one slot) and SCSI bus interface (resides inside DART module). More controllers are fully compatible with the Lotus/Intel/Microsoft Expanded Memory Specification (LIM/EMS). Provision is also made to address memory significantly beyond LIM/EMS limitations.

Auto-configuration and diagnostics software is provided, along with a virtual disk driver package that lets users set aside a portion of the expanded memory to act as temporary, high-speed storage when the unit is configured as memory expansion.

Parity error correction is standard on all controllers. Turbo Error Detection and Correction is also standard. Double-word error correction needs an overhead of only 11 percent to correct any single bit error and detect any double bit error. A High-Speed Static Cache Memory stores the last transaction in local memory to optimize data transfer rate.

DART is easily bootable from RAM drive and can interface with tape or other hard disk backup systems. Drivers are available for most operating systems, including DOS, UNIX and XENIX.

DART also features automatic power fail protection and includes an external AC power supply for connection to uninterruptible power supplies.

For additional information contact Newer Technology, 251 Whittier, Wichita, KS 67207; (316) 685-4904.

Mention that you read about it in *Computer Shopper*. ●

PC Help Program

continued from page 183

found the desired information in Polaris' help program, they are returned to the exact place in the original program from which they came.

Conversely, when leaving an application program to go into Polaris Rescue, the user can either go back to the beginning or, through a feature called "placemark exit," can return to Polaris Rescue at exactly the same place where he or she left.

2 Levels of Security Per Screen With 8 Access Codes Per Help File

Polaris Rescue has two levels of security which allows a central group, such as management or a technical department, to write procedures that can be used but not modified by the local user. However, since each user must be able to keep data relevant to his or her day-to-day operation, local users can easily update any information to which they have access, information secure only to them.

Up to 8 separate access codes can be assigned per file. Users can be limited to read only, read and write or be totally blocked from either seeing or changing the information, by screen or file.

Each File Can Have Up To 1,000 Interconnected Screens

A Polaris Rescue file can have up to 1,000 screens which can be linked together. Users can interconnect these screens in any manner most convenient or relevant to their tasks.

A regular help screen stays up as long as the user wants it. "Or the user can design screen sequences as a tutorial by specifying the amount of time, from 1 second to more than four minutes, that a screen can stay up," according to Leach. "This mode is very useful as a training aid in teaching applications and procedures to employees."

Users can assign 8 function keys and type in 22 lines per screen, each screen identified by a unique 15-character screen name.

"The need for easily accessible reference guides on the

continued on page 189

the Printer Enhancer

Printer Enhancer
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SELECT
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The Xetec Printer Enhancer improves the usefulness of your printer with the internal high-performance buffer, selectable font styles, and hardware and software support for two independent printers.

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Intelligent Printer Switch
The IPS allows the operation of one or two printers with independent selection of fonts and printer types. Nearly all families of dot matrix printers are supported thereby allowing the ***Printer Enhancer*** to appear totally transparent to the computer system. This feature is also selectable by software or front panel control.

High Performance Buffer
The internal 64K buffer is microprocessor controlled in a multi-tasking fashion that provides maximum data transfer while holding an average of 30 pages of text.

FULL CONTROL PANEL: The front panel controls include *Clear, Copy, Pause, Select,* and *Font* plus LED indicators for printer and font selections. CLEAR - clears the buffer data; COPY - prints copies of the buffer data; PAUSE - halts operation; SELECT - selects printer; FONT - selects font to be used. Printer types are selected on the rear panel DIP switch.

FRONT PANEL PROGRAMMING: Although control codes may be embedded in text for manipulation of the fonts, an alternative is provided that allows use of the ***control panel*** to select the various features like *Expand, Compress, Boldface, Underline,* etc.

INTERNAL DIAGNOSTICS: The internal diagnostics include a test for the buffer RAM, front panel switches and LEDs, plus set-up helps for various printers.

CERTIFICATION: Certified to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC rules.

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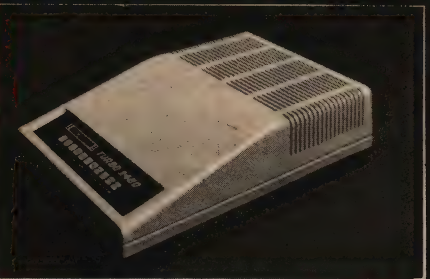

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VISA

CopyWrite For MSDOS Program Backups

by Ron Richardson

Some software companies use copy protection to prevent unauthorized copies of their software. This same copy protection prevents users from making legitimate backup copies. CopyWrite allows you to make copies of a number of popular copy protected software packages. Of course, it also allows the pirates to do the same. Because of the ever changing nature of copy protection, CopyWrite is updated monthly. Registered users can upgrade anytime for $15.00.

CopyWrite is really several separate programs, CopyWrite, Unguard, and RAMKEY. CopyWrite will copy the contents of a diskette, including the copy protection, on to another diskette. Unguard will create a completely unprotected copy of a diskette. This unprotected version can be copied with the DOS COPY program and can be copied to a hard disk. RAMKEY is a memory resident program that prevents some copy protected programs from verifying that the correct diskette is in drive A.

Some of the programs copyable with CopyWrite are: Bank Street Writer; Context MBA; Dollars & $ents V2.0; Flight Simulator; Harvard Project Manager; Mind Prober; Newsroom Clip-Art; PSF File; Project (Microsoft); Quick-Code III; R:Base 4000; Sargon III; Sideways; Symphony 1.0, 1.01; TK! Solver; VisiCalc rel. 1 and 1.1; VisiOn; VisiSpell; VisiWord; Word (Microsoft); Chart Master; Some Infocom games; Executive Picture Show; Graphwriter; Lotus 1-2-3 release 1A; Multiplan; Office Writer; PSF Write; Prokey 3.0; QuickReport; R:Graph; Sidekick; Sign Master; ThinkTank; Ultima II; VisiFile; VisiSchedule; Visi-Trend; Volkswriter Deluxe; and Zork.

Unguard will produce unprotected copies of most Soft-Guard SUPERLoK protected programs including the following: dBASE III; Lotus version 2.0; Symphony V1.1; dBASE III+; and SuperTree.

RAMKEY will allow copies of some software to run if RAMKEY is first loaded. These include: Early dBASE III releases; Electric Desk; Fastback; Harvard Total Project Manager; SPSS/PC+; Data Base Manager II; Diagram Master; Framework; and SPSS/PC.

A complete list of software that will work with the CopyWrite software is available from Quaid Software.

The only major package I know of that cannot be copied with one of the CopyWrite programs is Diagraph. (See *Computer Shopper*, November 1986, page 130) Diagraph is protected with a new Prolock protection program. Quaid Software stated that they were not covering that method because Vault Corporation, makers of Prolock, was in bankruptcy and they did not expect it to be popular. Vault Corporation has filed a law suit against Quaid Software for producing a program to copy Prolocked software.

My major concern in using CopyWrite is a statement on page 9 of the manual: "Whenever possible the authors of CopyWrite have inserted 'booby traps' into CopyWrite in an effort to thwart those who attempt to use it for illegal purposes" (emphasis is mine). The manual does not state what those booby traps are and a call to Quaid Software yielded no additional information.

CopyWrite and Unguard are menu driven programs, with no parameters to set. Using them is as easy as typing CopyWrite or Unguard and following the directions on the screen. Since the programs cannot deal with defective target disks, you should format the target disk first to make sure it has no bad spots. If you only have one floppy disk drive, the program will tell you when to switch disks. Unguard will also copy to and from a hard disk. If the resulting program requires RAMKEY, the copy program will tell you. You then simply include RAMKEY in your AUTOEXEC.BAT file.

The CopyWrite manual briefly explains how to use the software and some of the technical terms associated with copy protection. The 32-page manual has a table of contents but no index. This is not a major flaw since the program can be run without the manual. CopyWrite is not copy protected. Their customer service is free but the call is a toll call to Canada.

CopyWrite represents an excellent buy for $50.00. It allows you to make backup copies of most of your copy protected software. Some of these copies will then be unprotected. My only concern is the unspecified "booby traps" that Quaid Software builds into the program. I would feel much better if I knew what those "booby traps" were and more importantly, if I knew they would not damage my software or computer.

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CoCo 3

continued from page 97

product costs $19.95 and can be ordered from Spectrum Projects, P.O. Box 264, Howard Beach, NY 11414.

Because of deadlines and my own nature, I haven't had time to give the program a good look, and I'd rather wait until I have a bunch of programs at once to comment on. There should be some new software released between now and Christmas, but no one is giving any definitive word on what will be released when. OS-9 level II is almost finished, but no release date is yet promised. Deskmate III according to the 1987 Tandy computer (Catalog (#26-3259) should be available now, but has not yet shown up in the stores.

There is some controversy about how well third party software vendors will support the new machine. At the Rainbowfest at least a third fewer vendors were in attendance compared with the last couple of years that I was there. There is much speculation as to what that means. There are nasty rumors about some third party companies leaving the CoCo market entirely...only time will tell.

Compatibility

Radio Shack said that the new machines would be at least 95% compatible with old CoCo software. This figure probably is correct as they were speaking of software released by Tandy itself. The compatibility numbers are lower when you try third party software. Some biggies that will not run are CoCo Max, Dynacalc, VIP Writer (strangely, the version in VIP Library seems to work fine), and some versions of Telewriter. Versions of Telewriter patched with Telepatch will not run unless reworked. I will provide the file to that next month. Programs that will have problems are those which use the 96K scheme of switching ROMS in and out of RAM. Most games seem to work fine, although those using artifacted colors will only display in black and white. On a TV or composite color display they should look fine. The classic rule about upward compatibility applies here—if there is a program that you must absolutely use, take the disk to your Radio Shack store and try before you buy. There are no guarantees, as of this date, if any of the best third party programs will be upgraded in the near future!

Tech Talk

For starters, the new machine comes standard with 128K using four 32K chips, easily expandable to 512K, and displays 64 colors with 16 available on the screen at one time. The CoCo 3 is running the familiar 6809 CPU, but now running at 2 Mz (which sounds slow when compared to other machines, but the 2 Mz CoCo should outperform a standard 4.77 Mz IBM or compatible by a thorough put factor of about 30%. The 512K upgrade through Tandy will cost about $150 (I'm sure there will soon be third party kits cheaper). Expect the Tandy upgrade about January.

The new CoCo now contains two more resolution modes, 320x192 and 640x192. There is the familiar old 32 column screen display, with the addition of both 40 and 80 columns with true lower case, just like a real computer.

The new machine is totally hardware compatible with the older CoCos, with the exception of the Multi-Pak, which can be fixed by Tandy for a few dollars (a single chip in the unit has to be replaced). The CoCo is housed in the same basic case as the CoCo 2, with the cosmetic difference of a grey keyboard inset instead of the familiar black one. The CoCo 3 keyboard has 57 keys, the added keys being ALT, CRTL, F1 and F2, just like the keyboards some of us were able to pick up in Radio Shack stores during the summer of 1985. The back of the machine contains the familiar RS-232 port (which has been improved for good data transmission at 1200 baud), your standard cassette port and the same RF output. The difference is that now the machine sports both composite video and audio output jacks and a 10 pin RGB plug located underneath the machine.

Radio Shack Extended BASIC has been upgraded to Version 2, which contains many new graphics commands that support the 640 by 192 resolution in four colors and 320x192 in 16 colors.

Hands On Reaction

I've had a couple of days with my new CoCo with only a color TV (old and beat) for a display. The TV barely displays 40 columns and won't display 80 columns at all. The poor color of the set did not give me an exuberant impression of CoCo 3's graphics and color. With the CM-8 monitor I received today and a bunch of basic demos that show some of the machines stuff...I'm in heaven. The monitor's colors are rich and very saturated, owing to the nature of analog displays. The quality of 80 column text varies from fair to excellent, depending on the color sets you choose. The machine is running most of the software that I'm feeding it with no problems. Now if I could only get my hands on a version of CoCo Max for the 3! I do have a little difficulty with the new keyboard. The feel is

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PC Help Program

continued from page 186

standard operating procedures of a business is most acute with non-technical persons operating their PC under someone else's direction," says Leach. "Our program helps these people and also those users on a local network who need to understand the large amounts of information and procedures unique to their company's network and, thereby, operate the network more efficiently."

Polaris Software and Education Systems, Inc. (Wilmette, IL) are presently negotiating a joint marketing agreement in which Polaris Software will include that company's on-line "Microref" reference guides to such popular programs as Lotus 1-2-3, Multimate, and WordPerfect, in its Polaris Rescue package.

Price and Availability

Polaris Rescue users need an IBM PC or 100 percent-compatible microcomputer operating under DOS 2.0 or higher; 200KB of memory for the editor, 33KB for the RAM-resident portion of the program; and an IBM monochrome, CGA or EGA text color display.

Polaris Rescue, carrying a 30-day money back guarantee, will be available in volume in December from authorized dealers or direct from Polaris Software. Price per copy is $149.

For additional information contact Polaris Software, 613 West Valley Parkway, Ste. 323,, Escondido, CA 92025; 619/743-7800. ●

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The Drive M

continued from page 98

course, in TRSDOS, you could BUILD a DO file to take care of this for you but you would still have to type the command: DO (filename), or whatever, and answer the prompts. With MM's CP/M it's automatic.

Now, you should also see on your screen a directory of the files on the disk. If not, type DIR <ENTER> or MDIR <ENTER> or push F1 to see the directory. Select the utilities you want to copy, then use the PIP command to copy the files you selected onto the disk on drive B:. The command is:

```
PIP B: = A: (filename.ext)
```

If you sometimes get confused about which way the PIP is going just try to remember that the space after the PIP means "to," and the equals sign (=) means "from." Our command says, "PIP to drive B: from drive A: the following file." The files I use regularly are: DISK.FDF, MDIR.COM, PIP.COM, SYSGEN.COM, CONFIG.COM, DUP.COM and KEYDEF.COM.

After PIPing the files to drive B:, press the F2 key (or type DIR B: <ENTER>) to see the results of your efforts. Now you need to call up the Configuration program by typing:

```
CONFIG <ENTER>
```

or by pressing the CTRL key and F2. When you get to the CONFIG menu you will see eight choices lettered from A to H. The one you want for this particular operation is H, which is really a SYSGEN command but with some additions. When you press H, you will be asked for the drive on which to save the current configuration. Since your new disk is in drive B:, choose B. Then it will ask you to type in the program name, or command, you wish to have executed on start-up.

If, for example, you were doing this on a WordStar disk and wished the disk to start up and go directly into WordStar, you would put WS <ENTER> here. It will work for any program that happens to be on the disk.

In our case we want it to start up and begin PIPing all the utilities onto drive M:, so we will type:

```
PIP M: = A:*.* (ENTER)
```

This command will do just that. Take note of the space after PIP and the asterisk-dot-asterisk after A:. This means, "PIP to M: from A: any file name it finds with any extension. In other words, everything! Resist the temptation to use the F3 key to start this because for some reason it will drop out the "I" in PIP giving PP M: = , and the command won't work. Also, the "I" will pop up later after the A> where it's not wanted. Type in each character, just as shown.

When you press enter, it will ask you if you want the CP/M banner to display on start-up. You may wish this to happen because along with the banner will be the "drive M: ENABLED" message, telling you that the RAM chips are working correctly and are ready for your PIP. Answer Y for Yes. When it is finished it will say, "Configuration saved, Push ENTER for menu." Pushing ENTER will return you to the Configurations Options menu from which you press BREAK the same as that of the CoCo II, but with the increased number of keys in the same space, the RETURN key has been made quite small and is

continued on page 192

TRSCROSS

continued from page 97

Display Directory option to make sure the files were on the disk, and used the Purge option to delete some of the files. Going back and forth from "Copy to TRS-80 diskette" to "Display Directory" to "Purge TRS-80 Diskette" is extremely easy.

I tried using TRSCROSS to transfer to the PC some files written in LazyWriter on an LNW80 (an obsolete clone of the TRS-80), and it worked fine, a great deal faster than the only other way I'd previously had available: using cables between the LNW80 and the PC, and transfer programs that were elaborate and time-consuming. If we'd had TRSCROSS six months previously, when we transferred from LNW80 machines to AT&T PC 6300 computers, instead of taking hours and hours to move the many files from one machine to the other, one file at a time, we could have done it in minutes, a diskful at a time.

TRSCROSS reads from, and copies to, these TRS-80 double-density formats: TRSDOS 1.2/1.3, TRSDOS 6.2, LDOS 5.1.4, DOSPLUS 3.5, NEWDOS/80, and MultiDOS. Earlier versions of TRSDOS and LDOS can be read by TRSCROSS, but one or more sectors may be skipped because of a format problem. Also, one or more sectors may be skipped on some NEWDOS formats.

TRSCROSS requires a PC or compatible computer, 128K and a normal 360 KB (40-track) PC drive. Double-sided operation is supported, but not 80-track. The Tandy 1000 requires an extra memory card because the card contains the required DMA chip. The Tandy 3000 is supported, if you have a 360KB drive for transferring, rather than the hi-density drive. Because the program must access floppies that would otherwise be totally unreadable on a PC, PowerSoft accesses the diskette controller directly. Which means that fairly complete PC-hardware compatibility is required. For example, the Tandy 2000 is not supported.

TRSCROSS is $89.95, plus $3 S&H, from PowerSoft, 17060 Dallas Parkway, Suite 114, Dallax, TX 75248; telephone (214) 733-4475.

PowerSoft specializes in TRS-80 utilities, and wrote the SuperCross/XT file transfer program, which was reviewed enthusiastically here recently (September 1986), and Super Utility + , reviewed here some months ago. Both SuperCross and Super Utility are in Radio Shack's current Software Reference Guide. ●

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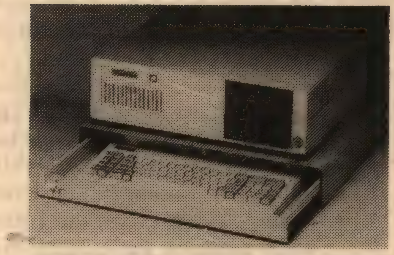

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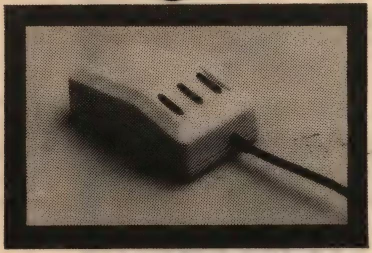

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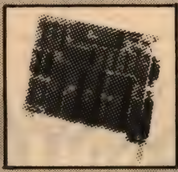

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CoCo 3

continued from page 189

located dangerously close to the CLEAR key.

OS-9

OS-9ers have hardly been forgotten...OS-9 level II, when available for the CoCo 3, will contain the added enhancements of a built in windowing scheme. This will allow you, for example, to have a word processor running, while you're downloading some BBS files. At the same time you can have a spreadsheet calculating all the while a file is being spell checked! You can run up to 14 windows on the screen at once. OS-9 Version 2 programs will run without a hitch while Version 1 software will not. OS-9 level II is the operating system for the new CoCo. Most of the heavy duty software you will see will use it.

There will be an optional Macintosh-like interface called Multi-Vue with pull down windows, etc., except in full color and faster than the Mac! The package will cost $49.95. For the first time those not enamored of OS-9 can be using it and never know it's there. It can be as invisible or visible as the user wants! Basic 09 is now being bundled with Level II. The package will retail for $79.95 (Catalog #26-3031). An OS-9 Level II developers package will also be available. It will include hard disk drivers, an editor/assembler and lots of other goodies.

Let's take a look at the new hardware in more detail. The new RAM capabilities are being handled by a custom MMU (Memory Management Unit) called GIME (Graphic Interrupt Memory Enhancer) that replaces the old (outdated) SAM and VDG chips. This custom chip handles dynamic address translation and allows real access to a full ½ Mbyte of RAM without the clumsy bank switching that is implemented in third party RAM boards that are no more than RAM disks. Tandy will upgrade the stock 32x4 K RAMS with an add-on RAM board holding two banks of 256K chips. The board will be available from Tandy National Parts and is therefore user upgradable. The new CoCo only contains 11 ICs because of Very Large Scale Integration (VLSI).

The joystick port has been fixed to allow two button operation. A Hi-Res joystick adaptor will be available that will allow you to access all 640 screen positions. The adaptor will cost about $10.

I haven't been this excited about a new computer in a long time. My trusty IBM clone sits alone in the corner neglected. I don't think it will see much usage in the near future. When the software does start to come, the new CoCo will be the hottest "home" computer on the market. The two real competitors, the Aari 130 XE and the Commodore 128, both come up lacking in any head to head comparison.

Except for the current lack of CoCo 3 specific software, there hasn't been a more exciting time to be involved with the CoCo. If you weren't sure what you wanted under your Christmas tree...here's the gift for you. There should be some software available from Radio Shack by the time that you read this. It will be an interesting winter.

Anyone wanting to contact me can write me c/o *Computer Shopper* or on Compuserve (ID #72245,126). ●

The Drive M

continued from page 190

to return to the system prompt A>.

Now comes the BIG TEST! Remove your system disk from drive A: and move your new DRIVE M: LOADER disk from drive B: to drive A: and push RESET. The first thing that will happen is your drive M: (in RAM) will be wiped clean. Next, the disk will start up and show the CP/M banner followed by the "drive M: ENABLED" message. Then it will begin copying each of its files onto the drive M: RAM disk, showing each file on the screen as it gets copied.

When finished you can remove your loader disk and put it away. If all goes well, you'll want to put a write-protect tab over the notch to protect it.

Computer programs can be a little clumsy when used just as they come, right out of the box. This simple change is one of the many ways you can customize MonteZuma Micro's CP/M 2.2 to your own liking. ●

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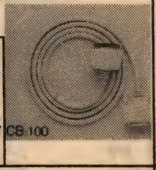

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The Silver Box

continued from page 116

each node and many points in a large data file. High resolution graphics require exponentially more complex calculations. This is where sheer speed of modern computers is required and this is where the computers of tomorrow are headed.

The V20 And The BIOS

As you all know very well, the use of V20 requires a little modification of disk I/O software to restore the overshortened timing which is executed by the V20 in much reduced number of clock cycles. This can be as short as a factor of about 5.7 when you change the CPU from 8088 to the V20. This is the reason we have to patch the FORMAT.COM and the DCOPY.COM when the CPU is switched. Then, the question arises, does the Sanyo BIOS have a similar problem?

The answer is a simple yes, as far as I'm concerned. In casual operation, you may not detect sometimes almost imperceptible but definitely reduced reliability. The difference in operation can be subtle, but you will encounter a diminished disk reliability. I never had any disk problems before I installed the speed board. However, during September 1986, I had two mysterious disk failures. Since the last of these problems, I had to carry out important jobs at the normal clock speed until I fixed the problems by upgrading the RAMs and applying some patches to the BIOS.

There was some chance that the problems might have also been related to a particular RAM chip which could have had a faulty cell or slower access time than others.

I had been using all Hitachi memory chips without any problems since 1984. In early October 1986, my system crashed without any apparent reason. I traced the problem to a single memory chip on the motherboard. It was an MCM4164T1, the single chip which was not made by Hitachi. Sometime afterward, I remembered how it had gotten here. It arrived here on one of the add-on boards. I replaced the offending chip and all the 200 ns memories with 150 ns chips. I then patched the Sanyo BIOS. After these improvements, there has been none of the disk access problems.

When I faced the problems described above, the first thing I decided to do was to install 150 ns DRAM chips exclusively instead of 200 ns chips. At 7.3 MHZ, the speed board CPU clock frequency, you have just about 205 ns CPU timing in accessing the DRAMs using V20-8. Most Japanese 200 ns DRAMs will work down to about 150 ns, but this is too close to the limits if you add up all the delays of decoding and buffer ICs.

The next thing I did was to eliminate all the "AAM" instructions from the timing loops in the Disk I/O routines of the Sanyo BIOS. Thanks to the Sanyo engineering team which decided to put all the disk I/O routines in the portion of the BIOS residing in the RAM, rewriting the disk I/O routines is simple. The situation for the PC-clones is different. In them, most of the I/O routines are in the ROM and you have to have a ROM writer. The whole process is anything but easy.

I checked all the Sanyo BIOS Versions for the MSDOS 2.11 I have in my collection. The results are shown in Listing 1.

Which BIOS Version To Use

In this collection of BIOS Versions in Listing 1, I became particularly curious in the two versions of the 256K [VB] BIOS, Version 1.02 and Version 1.03, both of which have the same date stamp! Another reason why I am so interested in finding out the difference between the two versions is because I have been using both of these without knowing which one I have in my system disks. Precisely speaking, I have been using a patched BIOS with Tampa Bay Digital's Missing Link patch, but I did not know which version I had patched when I installed the Missing Link board, until I looked carefully at the copyright notice.

The BIOS 1.02 and 1.03

The difference between Version 1.02 and Version 1.03 is

continued on page 198

TI Forum

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the wafertape drive had some problems: it didn't work.

An audio cassette interface, similar to the one used by the 99/4A, was included, though and OLD/SAVE CS1 was supported.

Interestingly enough, the 99/2 used a TMS9995 16-bit NMOS microprocessor, one that some of the planned new 99-compatible computers of today are rumored to use.

That a computer designed in only eight months could be obsolete by the time of its introduction is not a comforting thought. Myarc's new computer has been in development for well over a year, for example. A better combination of pricing and competition will be necessary for a new 99-compatible computer to fly, and these two factors are mostly out of the hands of the manufacturer. For the sake of the continuation of the generation of 99-compatible computers, we must hope that history does not repeat itself. ●

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5.25" DSDD-96TPI	1.62	1.47	1.35	1.29
5.25" HIGH DENSITY	2.89	2.69	2.49	2.39
3.50" SSDD-135TPI	2.00	1.88	1.74	1.63
3.50" DSDD-135TPI	2.97	2.74	2.49	2.25

3M	QUANTITY			
	10	50	100	500
5.25" SSDD	1.30	1.20	1.11	1.04
5.25" DSDD	1.82	1.68	1.56	1.45
5.25" DSDD-96TPI	3.18	2.94	2.73	2.55
5.25" HIGH DENSITY	3.70	3.40	3.15	2.95
3.50" SSDD-135TPI	2.53	2.34	2.17	2.03
3.50" DSDD-135TPI	3.60	3.32	3.09	2.88

wabash	QUANTITY			
	10	50	100	500
5.25" SSSD	.92	.85	.79	.73
5.25" SSDD	.98	.91	.84	.79
5.25" DSDD	1.15	1.06	.99	.92
5.25" DSDD-96TPI	1.75	1.62	1.50	1.40
5.25" HIGH DENSITY	2.50	2.35	2.15	1.99
3.50" SSDD-135TPI	2.08	1.92	1.79	1.67
3.50" DSDD-135TPI	2.89	2.55	2.45	2.39

SKC	QUANTITY			
	10	50	100	500
5.25" SSDD	1.25	1.15	1.07	.99
5.25" DSDD	1.42	1.31	1.21	1.13
5.25" DSDD-96TPI	1.92	1.64	1.53	1.44
5.25" HIGH DENSITY	2.60	2.45	2.29	2.13
3.50" SSDD-135TPI	1.99	1.85	1.71	1.60
3.50" DSDD-135TPI	2.67	2.46	2.29	2.13

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☐ G.W. Basic	*$95*
☐ 80287-8 8MHZ	*$225*
☐ 80287-5 5MHZ	$195

- ***One Year Limited Warranty***
- ***Dealers and Corporate qty. Discounts available***

CLUB CT Mono AT compatible system

- Basic system as described above plus Monochrome Display card and IBM quality Monochrome monitor **$1311**

CLUB CT Color AT compatible system

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- Basic System as above
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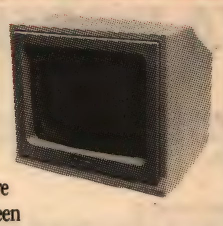
- Fully Assembly and tested, no installation required **$1508**

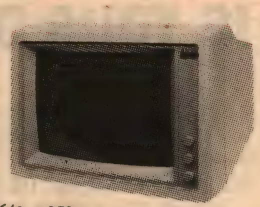
CLUB EGA Color AT system **$1782**

MONO MONITOR



- Nonglare
- 12″ screen
- 800 x 350 resolution
- FCC class 'B' approval **$138**
- IBM Color **$345**

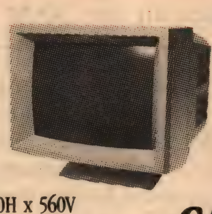
EGA MONITOR



- 640 x 350
- 640 x 200
- EGA and CGA
- FCC class 'B' approval

$480

NEC MULTISYNC



- 800H x 560V
- Test Mode Switch
- No Installation required
- EGA, PGA, CGA compatible

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CLUB EGA GRAPHIC CARD

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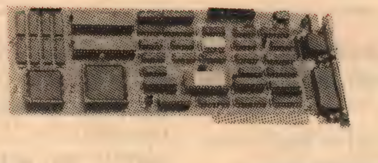
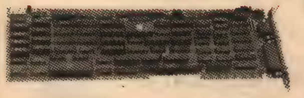


- Parallel Port
- Fully IBM compatible
- 256K video memory
- Runs color/mono display
- 16 colors 640 x 350 resolution

Quantity discounts available

Made in U.S.A.
Complies with FCC

UNIVERSAL DISPLAY

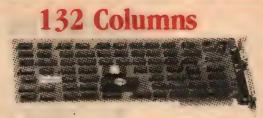


$248

- Parallel Port
- FCC class 'B' approval
- One Year Limited Warranty
- 132 columns text, color or mono
- Mono Display Hercules Compatible

HERCULES COMPATIBLE

132 Columns



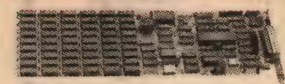
Made in U.S.A.

- Printer Port
- Software Switchable
- Monochrome Graphics
- Runs Lotus 123 Graphics
- Run 132 x 44 column display

Comply with FCC class 'B'

$99

6-PAC COMPATIBLE

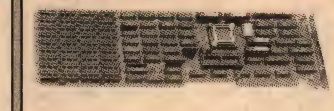


CLUB 384 (for PC)

- Serial Port
- Parallel Port
- 0-384K Memory
- Clock/Calendar
- FCC class 'B' approved
- Game Port and software

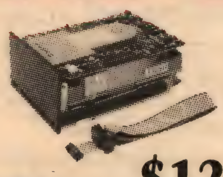
$88

CLUB TURBO



- w/128K RAM **$399**
- Runs 80287 math-processor in 5 MHZ or 8 MHZ speed
- Runs 7 times faster than PC or 33% faster than the IBM AT

HIGH CAPACITY

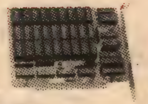


80MB **$1295**
28 ms Access time

- Manual
- With software

CALL

MEMORY CARD



Made in U.S.A.

$55 **CLUB 576**
(for PC, Portable)

- Software
- Short Card
- 0-576K Memory
- Supports 64K/256K DRAM

Made in U.S.A.

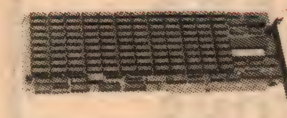
MINI I/O FOR XT/AT

- Software
- Parallel Port
- Half size card
- Real time clock/calendar
- 2 serial Port (2nd optional)

Made in U.S.A.

$75

AT MEMORY CARD



CLUB 3000

- No Piggy back
- 0-3 MB capacity
- 64k/256K RAM chips **$155**
- One Year Limited Warranty
- FCC class 'B' approval

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AT-MULTIFUNCTION CARD

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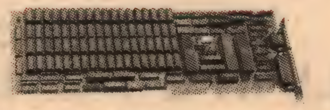
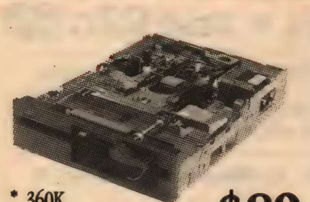


FCC APPROVED

- Game port
- 0-2MB Memory
- Runs at 12 MHZ
- 128K Increment range
- 2 Serial port (1 option)
- Self Installing software

12MHZ AT-Multifunction
Made in U.S.A.

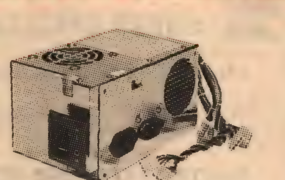
FLOPPY DISK DRIVE



- 360K
- Half height
- TEAC/FUJITSU
- Double density
- IBM grey color extra

$89

XT POWER SUPPLY

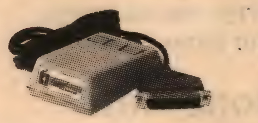


- 135W
- Reliable
- Complies with FCC
- Direct replacement
- One Year Limited Warranty

$83

MOUSE

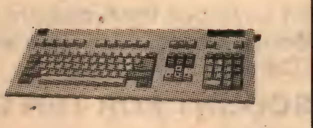
Microsoft Compatible



- 200 Dots/inch
- Work with Auto-Cad **$75**
- 3 Buttons/built in Microprocessor

Mouse with DR. HALO **$109**

PRO KEYBOARD



5151 **$88**

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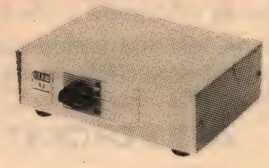

- Cable included **$88**
- Printer Spooler for IBM
- Share one printer by 4 computer or 1 computer to 4 printer

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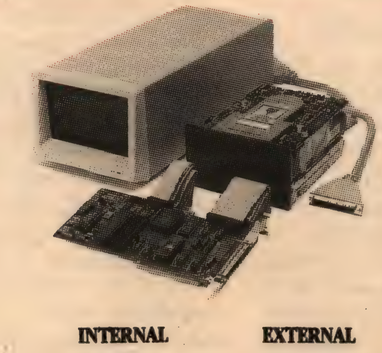
Upgrade Your PC/XT
Power Your XT

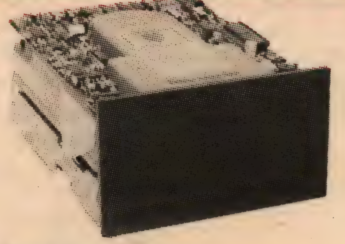


39 ms Access time

- Auto Head Park
- Boot from Hard disk
- Quality Seagate drive
- 39 ms average access time
- Software and Manual included
- Special Western Digital controller

	INTERNAL	EXTERNAL
☐ 20MB Hard Disk Subsystem Seagate 4026	$659	$759
☐ 30MB Hard Disk Subsystem Seagate 4038	$759	$859
☐ 40MB Hard Disk Subsystem Seagate (available now)	$859	$959

FAST AT HARD DISK DRIVE



39 ms Access time

- 39 ms access time
- Auto Head Parking
- Linear Voice Coil Activator
- One Year Limited Warranty
- Cables, AT sliding rail and Software included

20MB 4026	$528
30MB 4038	$628
40MB 4051	$699
72MB (23 ms)	$1195
80MB 4096 (28 ms)	$1295

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- Half size/Half power
- One Year Limited Warranty
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- Free Bitcom Communication Software

***2400 Baud CALL**

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CLUB XT TURBO 4.77/8.0 MHZ

- 360K Floppy Drive
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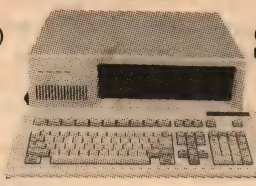
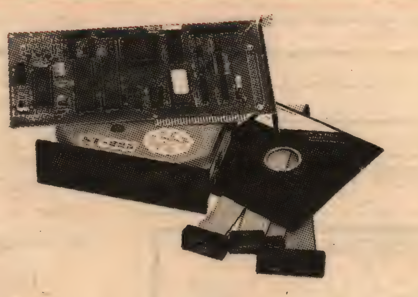
- Color: PC/XT Color
- Electrical: 115V220V
- 8088 CPU, 4.77 MHZ
- Legal Compatible BIOS
- Floppy Disk Controller
- 8087 Math Co-processor (option)
- Dimension: 17.5 x 19 x 6.1
- 640K Memory 765K Standard
- One Year Limited Warranty
- Quanity discounts available



$505

20/30 HARD DISK SUBSYSTEM



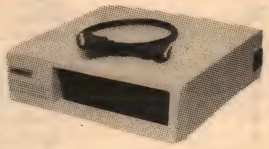
For PC Upgrade to XT

- 65MS access time
- Boots from Hard Disk
- Western Digital Controller
- Manual, Cables, Hardware and Software included
- 20/30MB Seagate Hard Disk

	INTERNAL	*EXTERNAL*
20MB	$375	$567
30MB	$475	

With Floppy Controller Add $50

EXPANSION CHASSIS



- 8 expansion slots
- No wait state design
- Round shielded cable
- 4 half height drive space
- Most compatible chassis on the market

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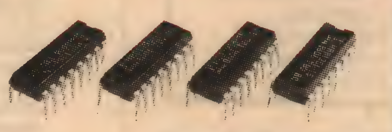
Seagate 4051	$638
Teac Floppy 360K	$85

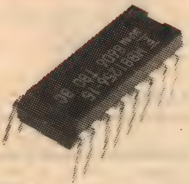
64K DRAM



150 ns (9 pcs.)

$9

256K RAM



150 ns (9 pcs.)
120 ns (add $9.00)

$27

OTHERS

HARD DISK CONTROLLERS

* Data Switch Box	*$68*
* PC/XT controller	*$90*
* Floppy controller	*$49*
* 25 Pin Serial Cable	*$18*
* Split Power Y-cable	*$8*
* IBM Type Printer Cable	*$15*
* IBM AT Bus Extended Card (good for test & debug)	*$30*
* AT HD/Floppy Controller	*$170*
* Compaq 286 Hard Disk Controller	*$188*
* PC/XT HD/Floppy Controller	*$140*

CHIPS

* EPROM 2764	*$6*
* EPROM 27128	*$8*

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* Teac	*$580*	*$680*
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* Kits for CLUB 2000, 2nd Serial Port	*$25*

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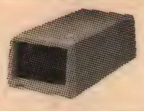
* AT keyboard	*$50*
* Math Co-processor	*CALL*
* Two Drive Chassis	$85
* Memory Short card	*$40*
* AT Power supply 192 watt	*$95*
* 6/8 MHZ AT-compatible computer	*CALL*
* AT HD/Floppy Controller (XT size)	*$160*
* XT HD/Floppy Controller (XT size)	*CALL*

CHASSIS

$99



- W/Power supply
- Good for 2 drives

AT HARD DISK/FLOPPY

- AT-compatible
- Western Digital Chipset

$170

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Market Trend
continued from page 115

history. What good is your program for tracking current individual stocks or funds?" My answer is two-fold. The program initially provides you with a tool to see the effect of different smoothing factors on old data, but it also allows you to accumulate and update weekly data on your current holdings. Using the program on new data will alert you to BUY and SELL signals after ten weeks!

Program Explanation

Whether you use the program for simulations or actual decisions, it's a good idea for you to understand a little about the inner workings and features of the program.

The program uses disk input/output to preserve your entered data, so you don't have to re-enter the data everytime you wish to try a different trend length. The program ignores any buy or sell signals for the first ten weeks while the trend data accumulates to yield a valid curve. As an added feature, the program calculates and shows the actual value of your investment, whether it is in stock fund shares or earning interest in a money market fund. Also, you are allowed to change the money market interest rate every week based on the then-current value, instead of the constant 10.4% I used for Table 1.

Program Anatomy

Program lines 10-160 introduce the program. Lines 170-190 allow you to specify the starting investment, the number of smoothing days (such as 50 or 200), and the disk filename. The extension .DAT is added later in the program in line 370.

Notice that line 180 shows the formula for calculating the weekly smoothing constant S. Ignoring the INTeger rounding, the formula is simply $S = 10/N$. This formula is an approximation of the true formula, but close enough. (The approximation formula is $S = (2*F)/N$, where S is the smoothing factor, N is the number of smoothing days desired, and F is the number of market changes per entry. In this case, we are using weekly entries and there are five market-days per week, so the factor $2*F$ becomes 10.)

Lines 200-240 allow you to start or continue an existing file, or to print an existing file with the just-specified smoothing constant and starting investment.

Lines 300-350 accept inputs for date, share value, share distribution status (which could force a recalculation of the smoothing curve) and the current money market fund interest rate. Line 360 looks for the "ZZZ" end flag to terminate entries.

As long as you continue to input data, lines 370-390 OPEN, WRITE and CLOSE the disk file for each group of data. Notice that the OPEN is followed by an "A", telling the computer to APPEND new data to existing data in the sequential disk file. The file is OPENed and CLOSEd between each WRITE cycle. Leaving it OPEN while you are typing your data leaves the disk file vulnerable to a power glitch that could destroy the entire file.

Lines 400-680 control the program display and, if requested, printout. The flag PR = 1 signifies that the printout has been requested. The variable COUNT is used to have the computer ignore any buy or sell signals during the first ten calculations, since the trend curve is still settling down.

Line 550 shows the trend formula, $TN = T + (V-T)*S$, and its INTeger rounding. TN is the new trend value. T is the previous trend value. V is the latest share value. S is the smoothing factor from line 180. Lines 590 and 600 transfer the latest investment value, either buying or selling, with the value of variables BUY and

continued on page 198

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FIGURE 1

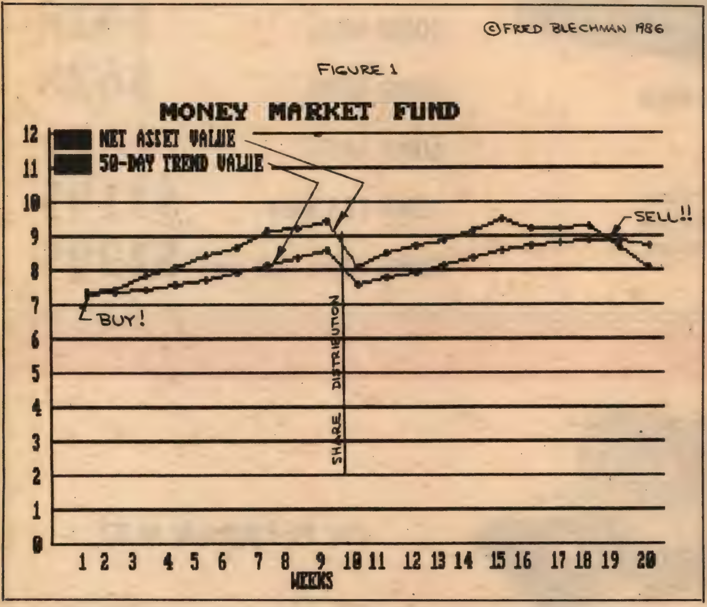

TABLE 1

```
                  Twentieth Century Growth Fund for 50 smoothing days.
DATE               VALUE/SHARE      TREND VALUE      SHARES           PRES.VALUE ($)
08/03/79            6.62             6.62             0                10000
08/10/79            6.85             6.666            0                10019.9
08/17/79            7.08             6.7488           0                10039.9
08/24/79            7.14             6.827            0                10060
08/31/79            7.19             6.8996           0                10080
09/07/79            7.1              6.9397           0                10100.1
09/14/79            7.34             7.0198           0                10120.3
09/21/79            7.69             7.1538           0                10140.5
09/28/79            7.69             7.261            0                10160.7
10/05/79            7.99             7.4068           0                10180.9
CURVE DOWN! SELL!!!
10/12/79            7.11             7.3474           0                10201.3
10/19/79            6.83             7.2439           0                10221.6
10/26/79            6.86             7.1671           0                10242
CURVE UP! BUY!!
11/02/79            7.22             7.1777           1418.56          10242
11/09/79            7.29             7.2002           1418.56          10341.3
11/16/79            7.76             7.3122           1418.56          11008
11/23/79            7.94             7.4378           1418.56          11263.3
11/30/79            8.3              7.6102           1418.56          11774
12/07/79            8.48             7.7842           1418.56          12029.4
12/14/79            9.02             8.0314           1418.56          12795.4
12/21/79            9.07             8.2391           1418.56          12866.3
12/28/79            9.27             8.4453           1418.56          13150
DISTRIBUTION OF SHARES! VALUE= 1.24
CURVE UP! BUY!!
01/04/80            7.94             7.4405           1656.17          13150
01/11/80            8.36             7.6244           1656.17          13845.6
01/18/80            8.56             7.8115           1656.17          14176.9
01/25/80            8.73             7.9952           1656.17          14458.4
02/01/80            8.99             8.1942           1656.17          14889
02/08/80            9.33             8.4214           1656.17          15452.1
02/15/80            9.1              8.5571           1656.17          15071.2
02/22/80            9.05             8.6557           1656.17          14988.4
02/29/80            9.13             8.7506           1656.17          15120.9
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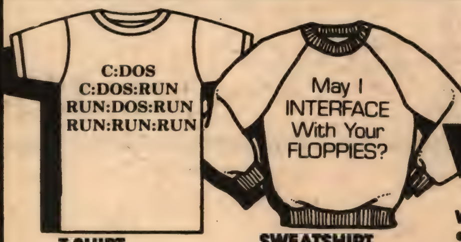

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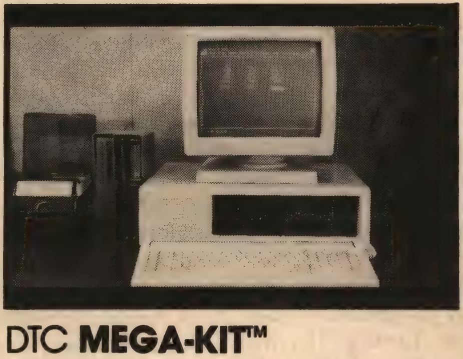

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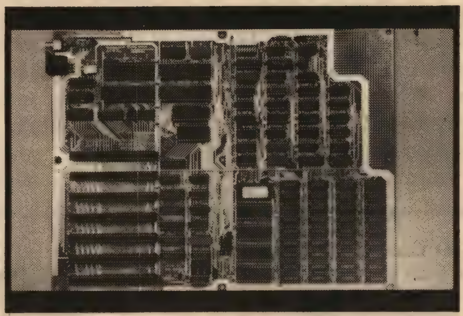

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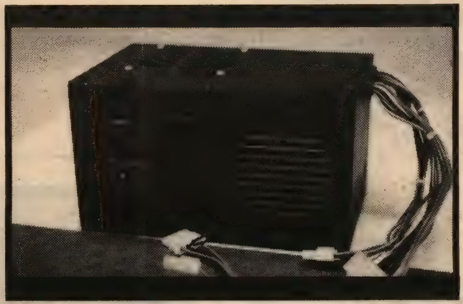

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The Silver Box

continued from page 193

small but could be significant. In Version 1.02, the beep sound routine destroys the CX register which sometimes carries important information such as floppy disk track and sector numbers. Suppose, if your disk drive encounters some difficulty and the CPU returns with an error code, disk error or otherwise, and when the beep routine was called, the CX register may be destroyed and may carry just any number when it comes back from the sound generation routine. If, then, some functions use the contents of the CX register, the error becomes very real and your system may hang, crash or indicate an error condition.

If you are going to work on the [VB] BIOS, make sure you have Version 1.03. To check the version number, you should look at the BIOS copyright notice by loading the IO.SYS in the memory using the poorman's mighty tracing tool, DEBUG. After loading your [VB] BIOS into memory, look at the location 2760H to 27DFH using "D" command of the DEBUG. If you do not have Version 1.03, you should talk to fellow members of your user's group. One of them will have one. If you are not a member, you can write to Sanyo at Moonachie, New Jersey. I understand they are glad to let you have the BIOS.

The V20 BIOS Patch

I compiled the necessary fragments of patches into two files each for the Video Board BIOS (DOS) and the Sanyo Screen BIOS (DOS). Among the Sanyo computer users, the word DOS and the BIOS are used interchangeably. This is not right. The word DOS should mean the MSDOS.SYS program. Most of us are using MSDOS Version 2.11. The IO.SYS program in the system disk is the BIOS, the Basic Input Output System, and we are concerned here with the versions of this IO.SYS which differs from version to version.

Please look at Listing 1, which lists the versions of the Sanyo BIOS (not DOS) I have collected. As seen in Listings 2 to 5, I wrote patching files. If you have Video Board use Listings 2 and 3. Make sure you have Version 1.03. The patch will not work with any other versions of the Sanyo BIOS.

If you do not use Video Board, use files shown in Listings 4 and 5. The patching operations in both patches are the same in both versions. The only difference is the locations of the codes requiring patches and that the Sanyo Screen BIOS, Version 1.00, has a two byte timing code in three locations and these require a different approach to get the right timing.

You must make a new system disk to get the patch work done. If anything, unanticipated happens, the disk may require reformatting, since you will read and write back the directory which is the single and only entity between the files and you besides the FAT (the File Address Table) and the IO.SYS which is the basis of the computer operations. Even one byte of misplaced code in the directory can render the disk unreadable. Even one byte of altered code in the IO.SYS can stop or upset the computer operation.

When you have finished typing the lists, you should print out the files and compare them line by line with the published

continued on page 235

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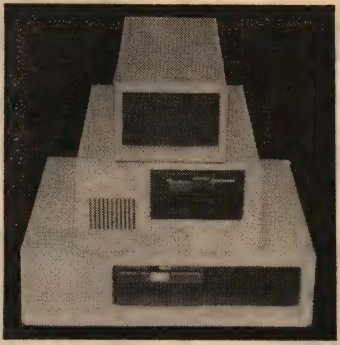

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Market Trend

continued from page 196

SELL acting as flags to ignore signals until they change.

Lines 610 and 620 update your investment value. If your money is in money market funds, the current rate of interest (divided by 365 days and multiplied by 7 days for the week) is added to the variable ACCT. If your money has been transferred to a stock fund, the ACCT value is the number of shares times the current share value.

Line 670 checks to see if the data file has ended. If so, the file is closed and the program ENDed.

Liens 1000-1040 buy shares of a stock fund, and lines 1100-1140 sell the shares and deposit the full value into a money market fund.

Lines 1200-1240 are involved only when a share distribution has been made. You are asked for the value of the distribution, after which line 1220 does the preliminary arithmetic correction. First a new percentage, P, is calculated by dividing the distribution value, D, by the last share value, VO. This percentage is then multiplied by the last trend value, P, and the result is then subtracted from the last trend value to give a new trend value, TC. This new trend value is then set to equal T, the last trend value for the new calculation performed by line 550. Trust me!

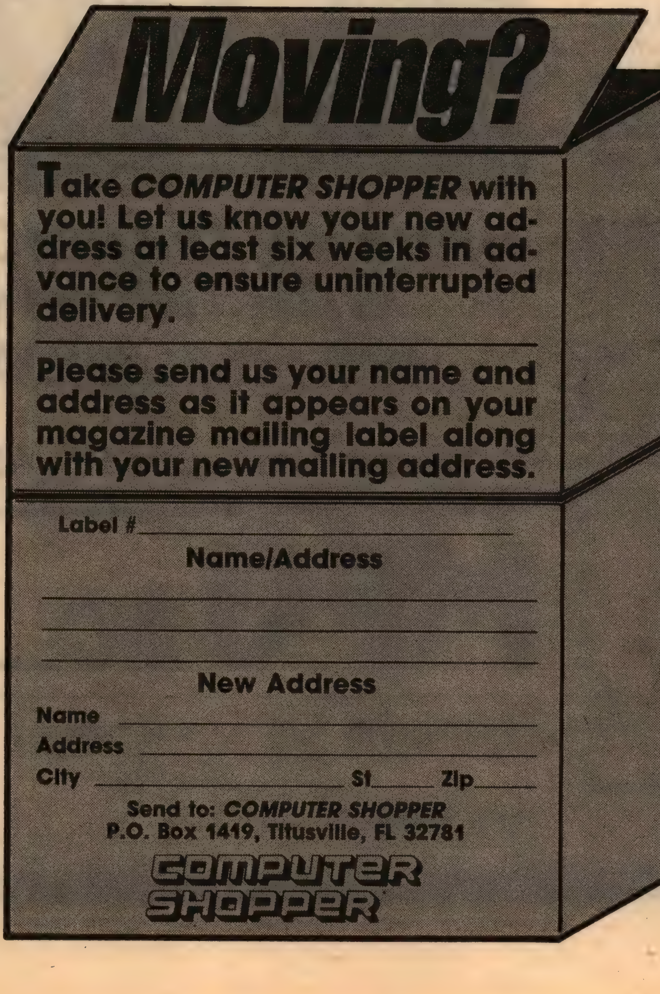
Advisory Only!

Generally speaking, the theory is that when the trend curve has been above the actual share value curve of a particular stock or fund for several weeks, and then crosses the actual line while moving upward, BUY that stock or mutual fund. If the trend curve has been below the actual values for several weeks and now crosses the actual line while moving downward, then SELL!!

The net effect is that you will tend to be in the stock market when it's going up, and protected in a money market fund when the stock market is going down. You won't catch all the highs or lows, but you'll be insulated from an extended downtrend. You'll have a safety net.

Bear in mind that this program is for advisory and simulation use only. Don't take every buy or sell signal literally since whipsaws in stock values can cause the trend to inch up and down aimlessly while the actual stock values criss-cross the trend curve.

You are welcome to send me 5% of your extra earnings from this advisory program—but don't come after me to cover any losses! Caveat emptor! ●



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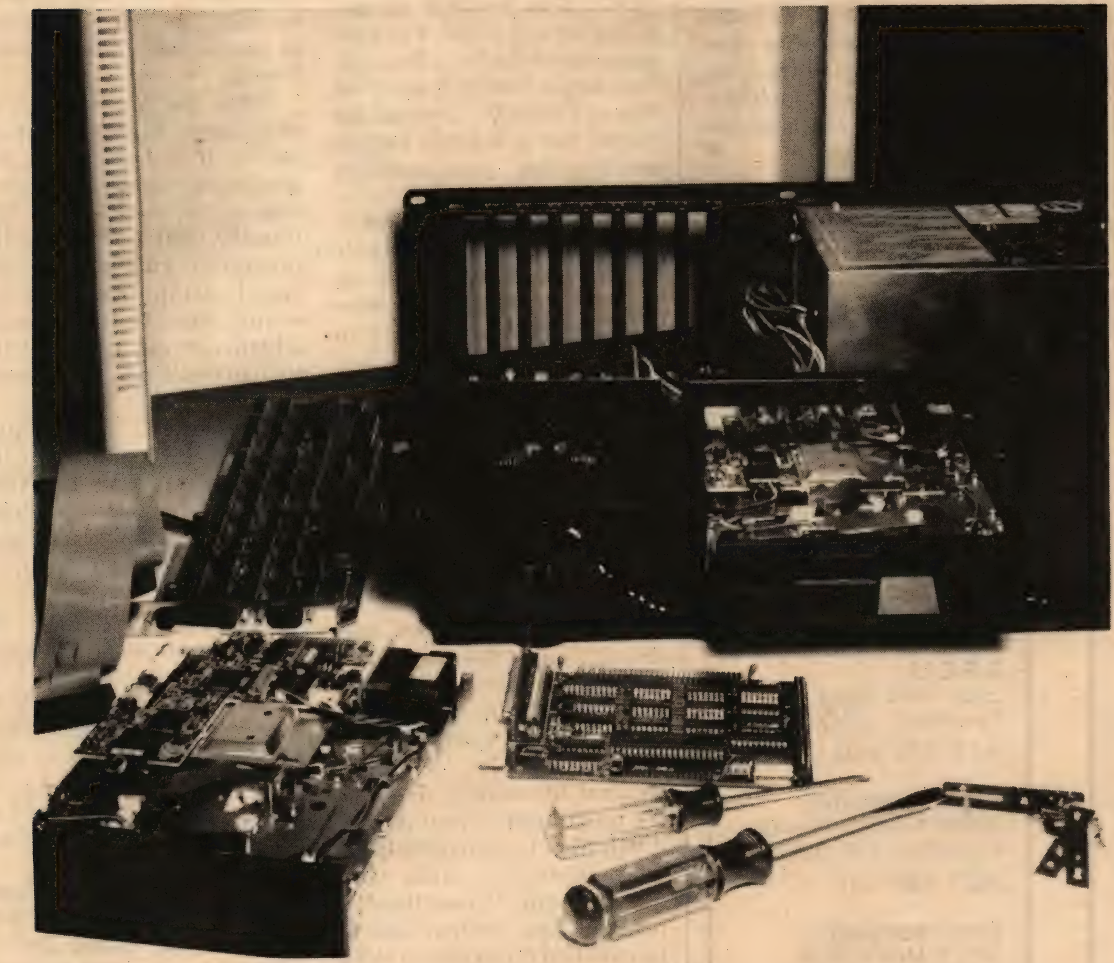

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Ask the Guru
continued from page 102

At a recent trade show, a minicomputer company was introducing a high end new laser printer, so they plastered their entire booth with AppleWriter graphics, printed, of course, on a LaserWriter.

And it sure packed their booth full of customers.

But, I guess I'll have to admit that, yes, there are flaws in AppleWriter graphics. In fact, until this column, the single most popular and single most often used Macintosh graphic image has been completely, totally, and utterly lacking from AppleWriter, and not available there in any way, shape, or form.

So, admitting defeat, in Figure 5 you will find a Postscript listing that we can call AppleWriter's Glaring Omission. You are correct. It was absolutely inexcusable for the Apple IIe/IIgs community to not be able to share this mainstream Mac graphic.

So sorry.

I've now got lots of new Postscript goodies available, some free, some not so free. Some will now run under AppleWorks, some on the Mac, even some on one of those Incredibily Boring Machines. Write or call for the usual free samples and whatever. ●

```
% John's Signature (Postscript)
% ..............................

1 setlinecap  /tension 2.8 def  /showtick false def

[87 82 100  80 130 85   93 158 0   94 122 -105
69.5 76 -135  58 69 160  60 81 65  115 120 0 ] curvetrace

[115 120 -160  106 110 -105  111 100 0
118 103 45  120 120 160 ] curvetrace

[120 120 -30  144 132 70  146 152 180  140 142 -110
128 100 -110  128 100 75  138 118 35  145 116 -75
147 100 0  155 110 60  165 120 0  160 100 -120] curvetrace

[160 100 55  177 120 0  176 100 0  188 110 45] curvetrace

50 100 translate 300 300 moveto

2 setlinewidth stroke
```

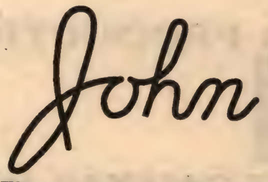

Fig. 4 - John's Signature.

```
% AppleWriter's Glaring Omission (Postscript)
% ............................................

gsave 1 setlinecap 5 setlinewidth 0 setgray  450 520
translate 27.5 rotate 8 {newpath 15 0 moveto 20 0
rlineto 10 0 rmoveto 12 0 rlineto stroke 45 rotate}
repeat grestore

newpath 0 setgray 300 400 100 0 360 arc fill gsave 1
setgray newpath 200 305 moveto 10 setlinewidth 200
0 rlineto stroke 200 495 moveto 170 0 rlineto stroke

grestore gsave 300 520 translate 1 setlinecap
newpath 0 0 moveto 50 100 125 -60 150 0 rcurveto
gsave 1 setgray 16 setlinewidth stroke grestore

12 setlinewidth gsave stroke grestore 8 setlinewidth
85 35 {dup mul exch dup mul add 1.0 exch sub}
setscreen gsave 0.99 setgray stroke grestore
grestoreall

gsave 350 340 translate 0 0 moveto 35 40 35 80 0 120
rcurveto 20 -40 20 -80 0 -120 rcurveto 1 setgray fill
grestore

grestoreall 0 setgray newpath 270 511 moveto 60 0
rlineto  0 -30 rlineto -60 0 rlineto closepath fill

showpage
```

Fig. 5 - Applewriter's Glaring Omission.

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The Digital Talking Clock

by Philip Chien

So, you don't like the Binary clock program which appeared in the December issue of *Computer Shopper*? How about a clock like the one you grew up with? No, I do not mean a grandfather clock, although that is available on the ProClock demo diskette—including ticking seconds, and chimes and bells on the hour.

In this digital electronic world of ours a much better, more hot shot, and up-to-date clock program is much more interesting. Digital Talking Clock is written in Applesoft BASIC, and will run in either DOS 3.3 or ProDOS on any Apple with a clock. The program is written for a Practical Peripherals ProClock and most other ProDOS compatible clocks, but it is fairly easy to modify for non-standard clocks. If you have a Type-n-Talk, Phasor, or other speech synthesizer, then your Apple can even speak the time on each minute. If you don't have a speech synthesizer, the program can still be used as a digital alarm clock. On the Apple IIc you will either have to use the internal ProClock IIc, or the IIc System Clock by Applied Engineering. The program assumes on the IIc that your speech board is attached to the modem port (phone icon).

Type in the program and save it to your diskette. If you have a modem, you can download the program from the Earth News Central BBS at 718-934-0774. It's located in General file number 7. After the program is in your Apple, it will have to be modified for your particular clock and speech boards. Lines 100-150 read the time, and may have to be modified if you have a clock other than the ProClock. Lines 200-240 send data from the program to your speech synthesizer. The program as written assumes that you have a Type-n-Talk attached to a serial card in slot 2, or to the IIc's modem port. The program will send whatever phrase is necessary through the variable SA$. If the time is 3:45 PM, then the program will send "3" "FORTY" "5" "P.M." to the port. If your speech synthesizer needs to call a special speech routine, then you will have to modify those lines. I have left a space in the program at line 20240 to load in your speech routines if necessary. Lines 200-500, 1080, 1190, 9290, and 9300, are used for the speech routines, and can be removed if you do not have a speech board.

While the program is running many functions can be called. If you want the program to say the time while it is running hit the "T" key. Hitting the "ESC" key while the program is running will give you the setup menu. You can adjust the colors, decide whether or not you want the time to be spoken, and even set an "alarm."

External I/O modifications are fairly easy to add for the hardware experimenter. When the alarm goes off, it will ring the Apple's bell once a second, and set off one of the annunciator ports. A piezo buzzer, or alarm can be hooked up through a proper relay to pins 14 and 8 of the Game I/O if you want to use the alarm to turn on an external appliance. Another annunciator is also used by the program. If a LED is attached to pins 13 and 8 of the Game I/O, then it will flash each second.

After the alarm has been triggered a "RETURN" will shut off the alarm and a "SPACE" will set the snooze

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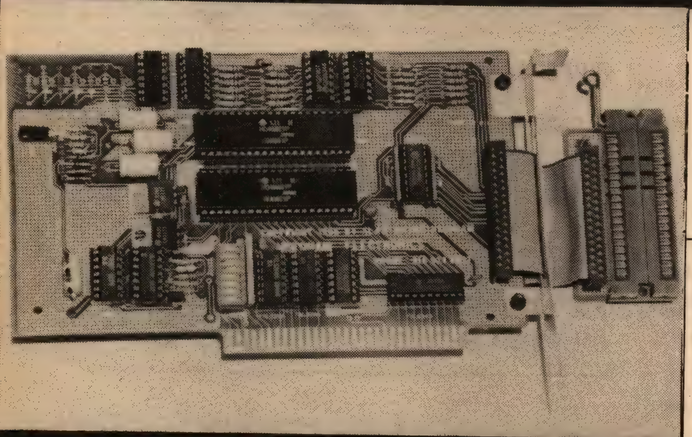

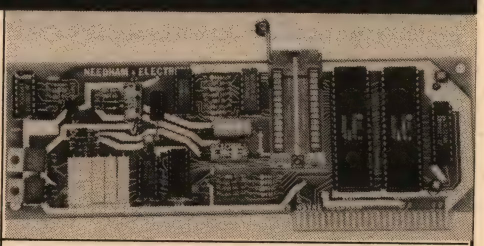

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Digital Talking Clock

continued from page 200

function (the snooze just resets the alarm for X minutes later. The variable is set through the setup menu).

How The Program Works

Lines 20000 to 20260 set up the program. The various arrays are read in, variables are set up, and the two annunciators are shut off. Lines 20180 to 20230 search for the ProClock. If a valid clock isn't found, then the program stops. If you are using the IIc System clock, or any other special clock, then replace these lines with the proper routines to load in your clock's drivers. The next several lines should be used to set up your speech board. If you need to load in a routine, send out control characters, or set up an interface, then put the commands here. The screen is then cleared, and the program jumps to the main loop at line 1010.

The main loop goes from line 1010 to 1160. Since the program can complete several loops each second, it "keeps busy" by randomly drawing color lines to keep busy (lines 1010-1020). (I hate plain, motionless, boring displays!) If the alarm has been triggered, then the Apple's bell is "rung" in line 1030. Lines 1040 to 1110 check to see if a key has been pressed. If any of the valid keys are hit, then the corresponding command is called. If you want to add extra commands which operate while the program is running, you can place them here. The variable "S" will have the ASCII value of any keystroke pressed. Line 1120 calls the subroutine in line 110 which reads the time. A "seconds" bar is plotted in lines 1130-1160, the time is printed at the bottom of the screen, and the second annunciator is flashed each second. If a LED is properly attached, it will flash on and off each second.

If the minute hasn't changed, then the loop repeats. If a new minute has started, then a flag (LM) is set, everything is redone. The present time is checked against the alarm time in line 1180. If it is the same, then the alarm flag is set, and the annunciator is triggered. If the speech flag is set, then the subroutine at line 400 is called to speak the time. If a new hour has started, and the bell flag is set, then the bell will be rung once.

Each time a new minute starts the screen will be cleared, and the various background borders will be plotted. Each digit will then be plotted in lines 1260 to 1310. Diagram #3 explains how the plot subroutines starting at line 520 works. A "PM" is plotted in lines 1320-1340. If the time is in the morning, then the "P" will be changed into an "A" in line 1350.

Lines 9000-9350 contain the set up menu, which controls the various defaults and alarm parameters. A "Default Input" subroutine starting with line 25000 is used quite often. The default input will provide the user with a suggested response, and return to the calling routine with the results as a number, a string variable, and an uppercase string variable. If the suggestion is correct, then the user just has to hit the return key. In addition the default input routine solves the lowercase problem too many program[illegible] value RU$ will retu[illegible] result whether or not an uppercase character is typed in.

The read clock subroutine starting with line 110 is fairly straightforward, and only needs to be modified if you have a special clock (e.g. external IIc Clock).

The speak routine in line 200 must be set up for your particular speech board. The Type-N-Talk, which the program is set up for, looks like a printer to the Apple. Line 210 tells the Apple to send output to the Type-n-Talk (well, actually it sends the output to the serial card in slot 2 which then sends the output on to the Type-n-Talk, but let's not be too picky) line 220 prints the phrase, and line 230 redirects output back out to the Apple. If your speech board uses a different technique, then those lines will have to be modified. Diagram #2 shows how to modify the program for use with the Phasor.

Lines 300-360 convert numbers into English. If the time is sent directly to the speech synthesizer, then 12:45pm will come out as "ONE TO FOUR FIVE P M." With the routine 12:45pm comes out as "TWELVE FORTY-FIVE P M." The convert subroutine will also convert two digit numbers into their corresponding phrases (e.g. the "teen" numbers).

Lines 400-500 take care of the quirks in telling time. The special cases of midnight and noon are taken care of separately here. If the clock has struck the hour, then an "O CLOCK" is added to the hour. (e.g. the program will say "FIVE O CLOCK" instead of "FIVE OH OH." If the minute is less than ten, then the program will take care of it also (e.g. "THREE OH FIVE"). Line 490 is a much too complicated method to determine whether to say "AM" or "PM."

Lines 520-620 plot the LORES numbers, as described in Diagram #3. Line 600 slashes zeros as needed.

continued on page 202

Diagram #1: Digital Talking Clock

```
0      REM
           Digital Talking Clock
1      REM
           (c) 1986 by Philip Chien


90     GOTO 20010
99     REM -------------------------
100    REM READ CLOCK
110     PRINT D$;"IN#";CS:
         PRINT D$;"PR#";CS
120     INPUT "%";CL$
130     INPUT "#";MO,DW,DT,HR,MN,SE
140     PRINT D$;"IN#0": PRINT D$;"PR#0"
150     RETURN
160    REM -------------------------
200    REM SAY PHRASE SA$
210     PRINT D$;"PR#2": REM TYPE-N-TALK
220     PRINT SA$
230     PRINT D$;"PR#0"
240     RETURN
250    REM -------------------------
300    REM NUMBER TO ENGLISH CALCULATOR
310     IF TI < 10 THEN SA$ = STR$ (TI):
         GOSUB 210: GOTO 360
320     IF TI < 21 THEN SA$ = A$(TI -
         10): GOSUB 210: GOTO 360
330     HT =  INT (TI / 10)
340     SA$ = A$(HT + 8): GOSUB 210
350     IF TI / 10 < >  INT (TI / 10)
         THEN SA$ =  STR$ (TI - HT * 10):
         GOSUB 210
360      RETURN
370    REM -------------------------
400    REM SPEAK TIME ROUTINE
810     IF HR = 0 AND MN = 0 THEN SA$ =
         "MIDNIT": GOSUB 210: GOTO 500
420     IF HR = 12 AND MN = 0 THEN SA$ =
         "NOON": GOSUB 210: GOTO 500
430     TI =  FN H(HR)
440     GOSUB 310
450     IF MN = 0 THEN SA$ = " O CLOCK":
         GOSUB 210: GOTO 490
460     TI = MN
470     IF MN < 10 THEN SA$ = " O ":
         GOSUB 210
480     GOSUB 310
490     SA$ = "      " +  CHR$ (65 + 15 *
         (HR > 11)) + "  M": GOSUB 210
500      RETURN
510    REM -------------------------
520    REM PLOT LORES NUMBER SUBROUTINE
530     IF  VAL ( MID$ (PL$(TI),1,1))
         THEN  HLIN X,X + 6 AT 10
540     IF  VAL ( MID$ (PL$(TI),2,1))
         THEN  HLIN X,X + 6 AT 20
550     IF  VAL ( MID$ (PL$(TI),3,1))
         THEN  HLIN X,X + 6 AT 30
560     IF  VAL ( MID$ (PL$(TI),4,1))
         THEN  VLIN 10,20 AT X
570     IF  VAL ( MID$ (PL$(TI),5,1))
         THEN  VLIN 10,20 AT X + 6
580     IF  VAL ( MID$ (PL$(TI),6,1))
         THEN  VLIN 20,30 AT X
590     IF  VAL ( MID$ (PL$(TI),7,1))
         THEN  VLIN 20,30 AT X + 6
600     IF TI = 0 THEN FOR  T = 10 TO 29:
         PLOT X + 9 - T * 3 / 10, T + 1:
            NEXT
610     REM I LIKE MY ZEROS SLASHED!
620     RETURN
630    REM -------------------------
1000   REM MAIN LOOP
1010   COLOR=  RND (1) * 16
1020   HLIN  RND (1) * 10 + 5, RND (1) *
        20 + 15 AT  RND (1) * 5 + 1
1030   IF AL THEN  PRINT  CHR$ (7):
        REM IF ALARM THEN RING BELL
1040   S =  PEEK (KB)
1050   IF S < 128 THEN 1120:
        REM HAS A KEY BEEN PRESSED?
1060    POKE ST,0: REM YES
1070    S = S - 32 * (S > 223):
         REM CHANGE LOWERCASE INTO UPPER
1080    IF S = 212 THEN  GOSUB 410:
         REM "T"; SAY TIME
1090    IF S = 155 THEN 9010:
         REM ESC; CHANGE DEFAULTS
1100    IF S = 141 THEN AH =  -1:AL = 0:
         POKE A1,0: REM CR; ALARM OFF
1110    IF S = 160 THEN AL = 0: POKE
         A1,0:AM = AM + LS: IF AM > 59
         THEN AM = AM - 60:AH = AH + 1:
         IF AH > 23 THEN AH = 0
1120   GOSUB 110
1130   COLOR= SC: PLOT SE * .66,37:
         REM PLOT SECONDS BAR
1140   POKE A2 + (SE / 2 =  INT (SE /
        2)),0: REM FLASH LED
1150   VTAB 21: POKE 36,5: PRINT CL$:
        VTAB 24
1160   IF LM = MN THEN 1010:
        REM STILL SAME MINUTE?
1170   LM = MN: REM NEW MINUTE
1180   IF AH = HR AND AM = MN THEN AL =
        1: POKE A1 + 1,0: REM ALARM ON
1190   IF SF THEN GOSUB 410: REM SAY TIME
1200   IF MN = 0 AND BF THEN PRINT CHR$
        (7): REM RING BELL ON HOUR
1210   COLOR= FC: FOR T = 8 TO 32: HLIN
        0,39 AT T: NEXT T
1220   COLOR= 0: HLIN 0,39 AT 37
1230   COLOR= BC: VLIN 7,33 AT 0: VLIN
        7,33 AT 39: HLIN 0,39 AT 7:
        HLIN 0, 39 AT 33
1240   COLOR= PC
1250   HO =  FN H(HR):X =  - 4: REM START
        PLOT AT FAR LEFT OF SCREEN
1260   TI =  INT (HO / 10): IF TI THEN
        GOSUB 530: REM PLOT TENS HOUR
1270   X = 4:TI = HO - ( INT (HO / 10) *
        10): GOSUB 530: REM PLOT UNITS HR
1280   PLOT 12,17: PLOT 12,23: REM COLON
1290   X = 14:TI =  INT (MN / 10): GOSUB
        530: REM PLOT TENS MINUTES
1300   X = 24:TI = MN - ( INT (MN / 10) *
        10): GOSUB 530: REM PLOT UNITS MN
1310   REM PLOT "PM"
1320   VLIN 10,18 AT 33: VLIN 22,29 AT
        33: VLIN 22,29 AT 37
1330   VLIN 10,14 AT 37: HLIN 33,37 AT
        14: HLIN 33,37 AT 22
1340   HLIN 33,37 AT 10: VLIN 22,26 AT 35
1350   IF HR < 12 THEN  VLIN 14,18 AT 37:
        REM "A" IN AM
1360   GOTO 1010
1380   REM ---------------------------
9000   REM SETUP MENU
9010   TEXT : CALL  - 936
9020   VTAB 2: PRINT "Today is    ";
        LEFT$ (CL$,16)
9030   PRINT : PRINT "Present time is  ";
        RIGHT$ (CL$,11)
9040   VTAB 6: PRINT "Alarm is ";
9050   IF AH =  - 1 THEN  PRINT "OFF":
        GOTO 9100
9060   PRINT "set for ";
9070   IF  FN H(AH) < 10 THEN  PRINT " ";
9080   PRINT  FN H(AH);":";: IF AM < 10
        THEN  PRINT "0";
9090   PRINT AM;"    "; CHR$ (65 + 15 *
        (AH > 11));"M"
9100   VTAB 15:PR$ = "Set A)larm,
        D)efaults, or Q)uit"
9110   DF$ = "Q": GOSUB 25010
9120   PRINT
9130   IF RU$ = "A" THEN 9160
9140   IF RU$ = "D" THEN 9270
9150   CALL  - 936: GR : GOTO 1170
9160   PR$ = "Alarm S)et O)ff":DF$ = "S":
        GOSUB 25010
9170   IF RU$ = "O" THEN AH =  - 1:
        AL = 0: GOTO 9010
9180   INPUT "HR ?";AH
9190   VTAB  PEEK (37): PRINT "MIN";:
        POKE 36,6
9200   INPUT ":";AM
9210   VTAB  PEEK (37): PRINT "A/P";:
        POKE 36,9
9220   INPUT AP$
9230   AH = AH + 12 * (AP$ = "P") - 12 *
        (AH = 12)
9240   PR$ = "Snooze length":DF$ = "10":
        GOSUB 25010
9250   LS = RT
9260   GOTO 9010
9270   PR$ = "Beep each hour Y/N":DF$ =
        CHR$ (78 + BF * 11)
9280   GOSUB 25010:BF = (RU$ = "Y")
9290   PR$ = "Speak each min Y/N":DF$ =
        CHR$ (78 + SF * 11)
9300   GOSUB 25010:SF = (RU$ = "Y")
9310   PR$ = "Foreground color":DF$ =
        STR$(FC): GOSUB 25010:FC = RT
9320   PR$ = "Border color":DF$ =  STR$
        (BC): GOSUB 25010:BC = RT
9330   PR$ = "Plot color":DF$ =  STR$
        (PC): GOSUB 25010:PC = RT
9340   PR$ = "Seconds color":DF$ =  STR$
        (SC): GOSUB 25010:SC = RT
9350   GOTO 9010
19998   REM --------------------------
20000   REM SETUP AND START PROGRAM
20010   TEXT : CALL  - 936
20020   DEF  FN H(HR) = HR - 12 * (HR >
         12) + 12 * ( NOT HR)
20030   BS$ = "": FOR T = 1 TO 50:BS$ =
         BS$ +  CHR$ (8): NEXT
20040   D$ =  CHR$ (4): REM EVERYBODY'S
         FAVORITE VARIABLE - CTRL-D
20050   DIM A$(13),PL$(9)
20060   DATA TEN,ELEVEN,TWELVE,THIRTEEN,
         FORTEEN,FIFTEEN,SIXTEEN
20070   DATA SEVENTEEN,EIGHTEEN,NINETEEN,
         TWENTY,THIRTY,FORTY,FIFTY
20080   FOR T = 0 TO 13: READ A$(T): NEXT
20090   DATA 1011111,0000101,1110110
20095   DATA 1110101,0101101,1111001
20100   DATA 1111011,1000101,1111111
20105   DATA 1101101
20110   FOR T = 0 TO 9: READ PL$(T): NEXT
20120   FC = 13:BC = 2:PC = 4:SC = 1:
         LS = 10:BF = 0:SF = 1:
         REM SETUP DEFAULTS
20130   AH =  - 1:TA = 38131
20140   A1 =  - 16294:A2 =  - 16292:
         REM GAME I/O ANNUNCIATORS
20150   POKE A1,0: POKE A2,0:
         REM SHUT OFF ANN PORTS
20160   KB =  - 16384:ST =  - 16368:
         REM KEYBOARD AND STROBE
20170   REM SEARCH FOR CLOCK
20180   FOR CS = 7 TO 1 STEP  - 1
20190   IF  PEEK (49152 + CS * 256 + 5) =
         255 AND PEEK (49152 + CS * 256
         + 7) = 5 THEN 20230
20200   REM $Cn05 = $FF  $Cn07 = $05
20210   NEXT CS
20220   PRINT "No clock found!": END
20230   REM CLOCK HAS BEEN FOUND
20240   REM LOAD YOUR SPEECH BOARD'S
         ROUTINES HERE (SEE TEXT)
20250   GR : LM =  - 1
20260   GOTO 1010
25000   REM DEFAULT INPUT ROUTINE
25010     PRINT PR$;"  ";DF$; LEFT$ (BS$,
           LEN (DF$) + 1);
25020     INPUT RT$
25030     IF RT$ = "" THEN RT$ = DF$
25040     RU$ = "": FOR T = 1 TO  LEN
           (RT$):RU$ = RU$ +  CHR$ ( ASC
           (MID$(RT$,T,1)) - 32 * (ASC
           (MID$ (RT$,T,1)) > 95)): NEXT
25050     RT =  VAL (RT$)
25060     RETURN
25070   REM DF$=DEFAULT, RT$ & RT=RETURN,
RU$=RETURN IN CAPS
```

Diagram #2: Modifications for the Phasor

```
DELETE: lines 210 through 230


ADD:    210 &T, SA$
        20245 PRINT D$;"-TTS"
```

Make sure that the TTS file (from the Phasor master diskette) is on your diskette, and that your program was typed into ProDOS.

Digital Talking Clock

continued from page 201

The only function used by the program is FNH:

FN H (HR) = HR – 12 * (HR □12) + 12 * (NOT HR)

This function changes the hour from the 0 to 23 provided by the clock into the 1 to 12 which we normally tell time with. 0 becomes 12AM (midnight to 1am), 1 to 12 remains unchanged, and 13 to 23 becomes 1 to 11 pm.

Digital Talking Clock can be very easily enhanced for various special functions. With very little modification it can say messages at pre-set times, or when the alarm is set rather than just ringing a bell. If you like military (24 hour time) then it is fairly easy to modify the program. Extra alarm functions can be added, and since the alarm triggers an annunciator port, it can control external appliances. Even more exotic and sophisticated applications are possible. With the addition of an Apple Cat modem you can use the clock program to answer the phone, control BSR X-10 appliances, and even re-program the X-10 controller's functions from a remote phone with the Apple Cat's touch tone decoder.

The Digital Talking Clock is a fun program to use, and an excellent demonstration program for your clock. If you add a X-10 controller and touch tone decoder, then it actually becomes a practical and cost effective remote control smart X-10 controller. But its most important function, and the reason I wrote it—is to impress friends when they hear the Apple say the time.

Minimum hardware requirements: Any Apple, A Pro-Clock, or other Apple compatible clock. Optional Hardware: any Apple compatible speech board.

Hardware Sources

ProClock, Practical Perpherials, 31245 La Baya Dr., Westlake Village, CA 91362, 800-641-0814, Retail Price: $159.

The ProClock is an excellent ProDOS and DOS 3.3 compatible clock. It will also work with Pascal and CP/M, and comes with drivers for both. A special internal version is available for the Apple IIc.

Type-n-Talk, Votrax, 1394 Rankin, Troy, MI 48083, 800-521-1350, Retail Price: $249.

The Type-n-Talk is a standalone speech synthesizer. From the computer's point of view the Type-n-Talk looks like a printer. It attaches to serial port, and attaches to an external speaker through an RCA jack. The Type-n-Talk's firmware automatically converts incoming English text into speech. It can also be programmed directly through its phoneme mode. Since it has its own microprocessor and memory, it is intelligent and takes up none of the computer's memory.

IIc System Clock $79, Z-RAM Ultra 2—256K $269, 512K $319, 1 Meg $399, Timemaster H.O. $129, Phasor $179, Applied Engineering, P.O. Box 798, Carrollton, TX 75006, 214-241-6060.

The IIc System Clock attaches to the modem port of the IIc. It requires a RAM-based driver program to run. A pass-thru port is provided, and can be attached to the speech board, or any other serial device.

Z-RAM Ultra 2 is a combination of an internal memory expansion board and clock for the IIc. It can also be enhanced with CP/M, or a 16 bit 65C816.

Timemaster H.O. is a ProDOS compatible clock for the II, II+, IIe.

Phasor is Applied Engineering's latest sound effects board. It can produce 12 sound channels, 4 white noise generators, and speech. ●

```
Diagram #3: How the character plot routines work

The characters in the LORES clock are generated similar to calculator seven
segment displays.  When certain segments are "lit up" (or in this case
plotted), each of the ten digits can be displayed.  Since there are seven
segments, a total of 128 possible different "digits" can be displayed, but
we are interested in only ten, the digits 0 through 9.

    1
**********    For example,                                    *........*
*        *                                                    *        *
*        *        If segments 2,4,5, and 7 are plotted,       *        *
*4       *5       the end result is the number 4:             *        *
*        *                                                    *        *
*   2    *    The bits to determine which segment is plotted  *        *
**********    are saved in string arrays (to save time and    **********
*        *    memory).  For 4, the array is:                  .        *
*        *                                                    .        *
*6       *7            PL$(4)="0101101"                       .        *
*        *                                                    .        *
*   3    *    Which indicates that segments 2,4,5,7 should    .        *
**********    be plotted.                                     .........*

For all ten digits the arrays, and results are:
("." unplotted "*" plotted)

....*                  *...*                      *****
.   *                  *   *                      .   *
.   *                  *   *                      .   *
....* PL$(1)="0000101" *****  PL$(4)="0101101"    ....* PL$(7)="1000101"
.   *                  .   *                      .   *
.   *                  .   *                      .   *
....*                  ....*                      ....*


*****                  *****                      *****
.   *                  *   .                      *   *
.   *                  *   .                      *   *
***** PL$(2)="1110110" *****  PL$(5)="1111001"    ***** PL$(8)="1111111"
*   .                  .   *                      *   *
*   .                  .   *                      *   *
*****                  *****                      *****


*****                  *****                      *****
.   *                  *   .                      *   *
.   *                  *   .                      *   *
***** PL$(3)="0101101" *****  PL$(6)="1111011"    ***** PL$(9)="1111101"
.   *                  *   *                      .   *
.   *                  *   *                      .   *
*****                  *****                      *****

*****
*   *
*   *
*...* PL$(0)="1011111" Zero is a special case. After the outside border
*   *                  is plotted, the slash is plotted in line 600.
*   *                  As mentioned in the REM in 610, I like my zeros
*****                  slashed!

The variable X is set to determine the X coordinate of the left side of the
number.  Since the hours never go over 12, the tens digit of the hour can
only be a one or zero.  A zero is not plotted.  (Have you ever seen a
digital clock which says 03:38 for 3:38AM?) Therefore the one (if the hour
is 10, 11 or 12) should be placed as far left as possible.  To do this a
negative X coordinate is given to the routine.

W*A*R*N*I*N*G*!  Should you modify the program and pass an hour greater
than 19 to the routine, then a >255 Error will occur when the routine tries
to plot a negative X coordinate.  If you do decide to modify the program
for a 24 hour clock, then the display will have to be moved to the right.

Lines 530 to 590 determine whether or not to plot lines as needed.

If segment 1 is needed then a high horizontal line is plotted
If segment 2 is needed then a medium horizontal line is plotted
If segment 3 is needed then a low horizontal line is plotted
If segment 4 is needed then a left high vertical line is plotted
If segment 5 is needed then a right high vertical line is plotted
If segment 6 is needed then a left low vertical line is plotted
If segment 7 is needed then a right low vertical line is plotted


The X cordinates are chosen as follows in the following layout of the lores
screen.

X:   -4   0 1   4    10    14     20  24     30
 0Y       +-------------------------------------------+
          |                                           |
          |                                           |
10Y   ....|.*   *******     *******   *******  *****  |
      .   | *   *     *  *  *     *   *     *  *   *  |
      .   | *   *     *     *     *   *     *  *****  |
20Y   ....|.*   *******     *******   *******  *   ?  |
      .   | *   *     *  *  *     *   *     *         |
      .   | *   *     *     *     *   *     *  *****  |
30Y   ....|.*   *******     *******   *******  * * *  |
          |                                    * * *  |
          +-------------------------------------------+

The colon is plotted in line 1280, and a PM is plotted in lines 1320, 1330,
1340.  If the time is before noon then the "P" is changed into a "A" in
line 1350.
```

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The Mysterious Slot 3

by Philip Chien

True or False: When you have an extended 80 column card installed in the AUX slot of Apple IIe you cannot use a card in slot 3?

False! Although many cards cannot be used in slot 3 with an AUX slot card, there are many others which will work. If you've got a filled Apple, then that extra slot can really help.

To understand which cards will work, and under what circumstances, you must understand how the Apple slot I/O works, and why the AUX slot replaces slot 3.

When Woz designed the Apple, potential expansion was a major concern. Eight slots were provided in each machine, and very early machines had the capability to add an extra eight, although that capability was never used. Each of the seven normal Apple slots has 272 memory locations dedicated to it, 256 bytes for a program ROM, and 16 locations for I/O. Besides the 256 byte program ROM which each slot "owns," a 2K program area is shared by the seven slots. slot 0 on the original Apple is a special case, it has the 16 I/O locations, but does not have the ROM locations, consequently it was usually dedicated to memory expansion. slot 7 also has extra video signals available, but other than that, all of the slots are identical.

Deciding what to place in what slot has caused many confusions. Originally Apple told users to place the first disk into slot 7, the highest slot. Apple's reasoning was that future versions of Apple's Monitor ROM (The Autostart ROM) would search through the slots for disk drives to automatically boot the disk drive. The search program would go through the slots in decending order, starting from the highest slot. Consequently Apple recommended slot 7. Well, for a couple of weeks at least. Somebody suddenly realized that slot 7 was the special slot with the extra video signals, and not exactly the best slot to utilize. Apple quickly corrected the original statement, and slot 6 became the standard disk drive slot for all time. Other slots are somewhat more arbitrary, and were chosen basically at random. Most users decided to put the primary printer interface into slot 1,

continued on page 204

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Mysterious Slot 3

continued from page 203

and an alternate I/O card into slot 2. There were exceptions to this "rule" though, AXIOM produced a printer designed to work in slot 4, and the Micromodem utility diskette used slot 4 as the default slot.

HELP! It appeared, at least for a while that every programmer and user would place cards into random slots, and every program would have to accept any possible combination.

The rescue came in the form of the UCSD P-system—Apple Pascal. When Apple introduced Apple Pascal in 1979, slot assignments were established, and placed in concrete. slot 1 was designated for printers and slot 2 for alternate I/O devices as before. slot 6 was the primary disk drive slot, and slots 4 and 5 were designated secondary disk drive slots. The most significant change was slot 3. Until 1979 the Apple was designed as a 40 column machine, but Pascal was oriented towards 80 column screens. A software solution (left and right windows) was built in, but Apple realized that users would want an 80 column display. Apple assumed that users would want to attach an external dumb terminal to the Apple through a serial card, and assigned slot 3 for that purpose. If a serial card and terminal were attached to slot 3, then the P-system would automatically use it as the I/O device.

Very quickly it turned out that users wanted 80 column displays for more than just Pascal, and second party manufacturers like Videx Inc. designed 80 column cards for slot 3. These cards are usually entire terminals, lacking only keyboards and screens. The emulate Datamedia terminals, which was what Apple Pascal was originally written for. The end by-product was that slot 3 was designated the standard slot for 80 column cards. Apple Pascal was introduced in 1979, and the slot assignment standard established has remained the standard since. New operating systems, programs, and documentation all finally got one standard to use.

When Apple III was introduced things became more confusing. Although Apple placed the disk drive into slot 6 as per the earlier standard, slot 7 was used as the printer interface. slots 1 through 4 were left open for the users, and slot 5 was not used. Fortunately Apple's standard slots were already well established, and the slot assignments did not change.

When the Apple IIe came out in 1983 one of the primary changes was to make the 80 column card an integral portion of the machine. Due to marketing department policies, the 80 column card could not be built in (Apple still thought that there was a market for home users with 40 column only displays). The solution was to design a new slot, the 60 pin AUX slot for the 80 column card. The AUX slot was designed with extra video and memory signals, and specifically intended for the extended 80 column card. For software compatibility reasons, the 80 column card in the AUX slot thinks it's in slot 3. The only other major change in the Apple IIe was the elimination of slot 0, since 64K was considered standard on the motherboard.

The end result of all this history is that most people believe that if you plug a card into the AUX slot, then you cannot use slot 3, since those slots are identical. As it turns out, this really isn't the case. The Apple extended 80 column card uses the standard 256 byte slot ROM (it's located in the CD ROM on the Apple's motherboard), but does not use the slot 3 I/O locations. According to the Apple Reference Manual: "Installing an 80 column text card in the auxilliary slot makes it impossible to run any peripheral card that has built-in firmware in slot 3. If an 80 column text card is not installed, a peripheral card in slot 3 will work properly." Consequently any card plugged into slot 3 will work, provided it doesn't need the program ROM. Look at the motherboard connector on your various I/O cards. If pin 1 (the I/O Select line) on the 50 pin connector is not used then the card should work without problems in slot 3. In addition, there are other special cases.

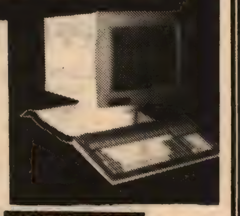
Certain cards, like the Applied Engineering Transwarp (Oct '86 *Computer Shopper*) and Swyft card (May '86 *Computer Shopper*) are designed to work in slot 3 without interfacing. These cards use the slot's power and I/O select lines, but do not use the ROM area. If a card is independent, and only uses the Apple's slot for power (e.g. the Apple Cat 212 expansion card in slot saver mode, or the Prometheus ProModem 1200A's piggyback board), then it will work without any problems in slot 3.

Cards without onboard program ROMs will work in slot 3, unless the driver program doesn't let you select slot 3. Many manufacturers choose not to put a program ROM onboard, and use a software driver instead. The various nine voice music cards, the Grafex-32 card (Nov '86 *Computer Shopper*), and the Microsoft Softcard II all fit into this category. Note that the Softcard I, and compatibles, do not fit into this category. They do not follow Apple's design guidelines, and use the ROM area for I/O registers.

There are special cases where a card with a program ROM will work in slot 3 without interference. If your program accesses the card's I/O registers directly, then there won't be any problems. Normally modem cards (e.g. Super Serial Card, Micromodem, etc.) use the onboard program ROM to access the modem, but programs like AE PRO access the modem's register directly, and do not use the program ROM. If you use AE PRO, then you can plug your modem into slot 3 without any problems.

The 5¼" Apple drive is a special case. The onboard P5A ROM is used to boot the drive, but is not used after an operating system is loaded. It is used, however, to determine which cards are in which slots. ProDOS uses these signature bytes to determine which slots have available drives. You can use an extra 5¼" drive in slot 3, provided that you are using DOS 3.3, or can "fool" the operating system into thinking that a valid device is in slot 3.

continued on page 206



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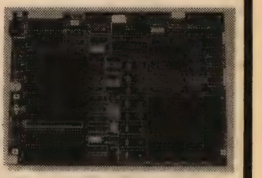

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MacUniverse
continued from page 104

Phone will not save the script.

A good example of how easy the scripts are to use is a problem I have been trying to solve with Red Ryder for over two months. I wanted to create a script that would take me to CompuServe's current quote page, open a capture file called "Stock Data," send a list of stock symbols, receive the data, close the file, and exit to the next menu. With Red Ryder, I have been unable to write the proper script. With MicroPhone, I had it scripted and running within 5 minutes.

MicroPhone appears to be crash proof. The only problems I have had is attempting to get it running when connected to the Macintosh printer port with AppleTalk connected. It will not even go to the opening screen.

MicroPhone can emulate two different types of terminals (the teletype and DEC's VT100), has a full range of operating parameters that include 20 user selectable baud rates (from 50 to 57,600), parity settings (even, odd, or none) data bits (seven or eight), stop bits (one or two), duplex settings (half, full, or echo), and supports ASCII, Xmodem MacBinary, and Ymodem data transfer. I have used MicroPhone to successfully communicate with CompuServe, Dialog, Dow Jones, GEnie, the Source, Westlaw, and numerous private bulletin boards.

The manual does a very good job of explaining how MicroPhone works. Its only shortcomings are it is too long (161 pages) and it is full of nonessential material. To help you along, MicroPhone comes with a series of predefined automatic log-on procedures for the major telecommunications services. All you have to do is enter your correct dial-up number, user id number, and password. And if the manual cannot answer your question, help can be found on CompuServe's MAUG SIG. Dennis Brothers is an assistant sysop there and the head Sysop, Neil Shapiro, wrote the manual. If either one of them cannot answer your question then no one can.

MicroPhone is not copy protected and works on all Macintoshes including the XL and the 128K. With the 128K expect smaller script and slower operations.

Whether or not you should get MicroPhone depends on your needs. There is no doubt in my mind that Red Ryder is more powerful than MicroPhone. The trouble is that because Red Ryder is more powerful, it is harder to use. Another consideration is price. Red Ryder is shareware and has a suggested price of $40. MicroPhone has a suggested price of $74.95. If you can get a copy of Red Ryder at a user group and are willing to learn to the ins and outs of its programming language, get it. On the other hand, if you are looking for an easy to use program, get MicroPhone.

Patches Redux: Last August and September I listed some patches that would remove copy protection on Microsoft application programs. Since then I have gotten over 13 letters (including one from Lichtenstein) saying they missed the patch for Word and could I please repeat it. All are repeated again. I do not guarantee these will work on all copies. It is possible that Microsoft changed the hex code in later copies. You will need FEDIT or some other file zapper program. Install these patches on a backup copy only. Do not install them on your master diskette!

Excel: HEX search for 608EBEDD, CHANGE to B1036ADD.

Word: search for DD6084BEDD, change to DD4E71BEDD.

CHART: search for DD60DD00126081, change to DD60DD00124E71

FILE: search for 126082BEDD, change to 124E71BEDD

MULTIPLAN: search for 12608007BE, change to 124E7107BE

As a practical matter, these patches may not be needed in the future. Microsoft has had a change of corporate policy and all future application programs will be unprotected.

Downloadable Software: Since the first MacUniverse column, I have discussed the best programs found in CompuServe's MAUG database. Recently I have noticed that programs are showing up on the other commercial services that are not available there. So in fairness to you, I am broadening my "Universe" so to speak. I will mention the best no matter where I find them.

The first program to be mentioned in this new endeavor is found in GEnie's Macintosh data library. Called EarthPlot, it lets you draw a picture of the Earth as seen from any height, at any latitude or longitude. You can literally generate a world map drawn from any perspective.

The second program that deserves discussion is the Talking Moose. This is a public domain desk accessory that is the most outrageous and fun program I have seen in a long time. Once installed in RAM, the Moose follows you around; where you go, he goes. He likes to pop up infrequently and says such things as "Don't fall asleep," "I wish I had a brain," and "Go ahead make my day."

Installing the Moose is very simple. Bring down the desk accessory menu and click on Talking Moose. An installation box with settings appear. You can control the rate he talks, the pitch he uses, the delay between appearances, the volume he talks at, and whether the Moose visually appears when he is talking.

What makes the Moose truly outstanding is that you can edit what he says. His stock phrases can be deleted and customized ones added. I even saw a Moose being used as a sales tool at a convention.

One of the better pranks I pulled was to have a friend sit down at my Macintosh with a customized Moose file. Every three minutes, the Moose appeared, called her by name, and made comments about her work.

The Moose is available on all the major telecommunication services. For full utilization, you will need the following files:

MOOSE.BIN—this is the desk accessory

MOOSE.DOC—this is the documentation for the Talking Moose.

MOOSE.RSC—this is the original phrase file for the Talking Moose.

MOOSEP.BIN—still more phrases for the Talking Moose

MOOSEG.BIN—this is a moose phrase maker. It does all the translation of English into phonetics, and updates the moose phrases file.

MacInTalk—this is Apple's speech synthesizer for the Macintosh. The Moose does not work on 128K Macintosh.

Addresses

UpTime—Trial issue $14.95, 12 issues—$89.50. P.O. Box 299, Newport, RI 02840, 800-437-0033.

SpellNow—Suggested Retail $59.95, Mainstay, 28611B Canwood St., Agoura Hills, CA 91301, 818-991-6540.

KidsTime—Suggested Retail $49.95, Great Wave Software, P.O. Box 5847, Stanford, CA 94305, 415-325-2202.

MicroPhone—Suggested Retail Price $74.95, Software Ventures, Suite 220, 2907 Claremont Ave., 415-644-3232.

Excel Upgrade—$25.00, Microsoft, 16011 NE 36th Way, Redmond, WA 98052-6399, 800-426-9400. ●

Mysterious Slot 3
continued from page 204

Way back near the beginning of this article I said that it was impossible to use an AUX slot card and a card in slot 3 which requires the program ROM at the same time. Well I lied, sorta. When the Apple IIe is first turned on, it determines if an 80 column card is installed, and if it toggles on the firmware. That firmware can be shut off through software, permiting you to toggle on and off access to the slot 3 card. A very popular public domain program available on bulletin boards lets you use a clock card in slot 3 under ProDOS using this technique. Whenever ProDOS wants the time, the routine toggles off the 80 column firmware, reads the clock, and turns the firmware back on. This technique does not interfere with the 80 column card, and if you need to access the clock from within another program (e.g. to set the time) then you can manually toggle the slotCXROM switch. slotCXROM is turned on at $C007 (-16377), and off at $C006 (-16378).

With a little fooling around, and knowing your Apple's limitations, you can make that empty slot useful. *sigh* Now what do you do when you use that slot, and still need more slots? ●

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Inside Commodore

by Ted Drude

Expanding The C-128's 8563 Video RAM

Here in the middle of winter, we've got some hot topics to keep your old Commodore warmed up! If you're a C-128 user, and handy with a soldering iron, you should enjoy this month's hardware project: upgrading your 8563 80 column video controller from 16K to 64K RAM. Now you'll REALLY have some elbow room for programming the 8563! Full instructions are presented here.

We'll also be continuing our ongoing technical discussions by taking a close look at the Commodore CP/M Plus Technical Documentation Package. This should especially be interesting to those who are doing assembly language programming and development work on the CP/M side of the C-128.

C-128 80 Column Video 64K RAM Upgrade

One of the nicest features of the C-128 is the built-in 80 column color video section and the MOS 8563 CRT controller. This chip is the equivalent of whole video adapter boards used in some other computers (read IBM). If Commodore ever decides to build inexpensive PC-clones to compete with machines like the Tandy 1000 EX, they could save a lot of money just by using the 8563.

Some Limitations

While it's a good chip, as those of you who have worked with the 8563 chip know, the way it's set up in the C-128 has some limitations which are frustrating to work with. Direct access to the video RAM is not allowed. Instead you must use the indirect method of reading, writing, and polling the chip registers to get at it. This slows down the video display speed somewhat.

Another limitation is that the display RAM is only 16K. In the text mode, that's enough room for one font (character set) and two text pages of characters with attributes (or four pages of characters without attributes). But in the hi-res graphics mode, there is room for just one bit-mapped screen, without attributes, period.

The 40 column 8564 VIC III chip, on the other hand, can directly access ANY 16K chunk of RAM in the C-128's two 64K banks. This allows for multiple characters sets, several hi-res bit maps, and many text screens which can be switched in or out instantly.

These techniques normally won't work with the 8563 because there just isn't enough memory. If more RAM were available, the 8563 could be programmed to do everything the VIC chip can and about as fast (with the exception of sprites) in double the resolution (640x200 vs. 320x200).

Scanning The C-128 PRG

The best reference information available on the 8563 chip is the *C-128 Programmer's Reference Guide* (PRG), which has two sections dealing with it. Chapter 10 is the main reference, including a very good 8563 programming tutorial, and detailed descriptions of the chip's 37 internal registers. Chapter 16 has the chip's electrical specs and a brief description of the complete 80 column video circuit.

As described in the PRG, the 8563 is more than just a super video chip. It also has an integrated memory controller which interfaces directly with common dynamic RAM chips. The 8563 provides all the necessary periodic RAM refreshes, and multiplexed chip addresses for its own needs. This drastically reduces the need for external circuitry.

If you read the PRG descriptions closely, you'll notice something very interesting. (I know it caught MY eye!) The 8563 is actually set up to work with either 4416 (16K) or 4164 (64K) RAM chips. Commodore decided to use only the 16K chips, perhaps for economic reasons. Yet, because the 8563 can support 64K chips, it's technically feasible to expand the 8563's video RAM.

After doing some investigation and experimenting on the topic, I can report that it's not only possible to upgrade the 8563 to a full 64K RAM, it's really rather simple, inexpensive, and it works! The total cost of this upgrade should be under $20, if you do it yourself. This includes the price of some new RAM chips, and a pair of good DIP sockets (which you'll want to add). I don't think that's too much to pay in order to give your C-128 as much video RAM as is totally available in a C-64!

This modification is also completely software transparent, so all the software you currently have will run fine. Of course, this doesn't mean that existing software will automatically take advantage of the extra RAM, either. For now, you will have to do most of your own programming to access to it. (I'll give you the basics on how this is done this month, and, hopefully, expand on it in the future.)

BEFORE You Begin...

While the basic RAM upgrade only involves swapping a couple of chips, there are some catches. This is not a modification for beginners. Since the chips to be replaced are soldered into the C-128's motherboard, you will need good soldering skills, and experience in using a desoldering device (like a solder sucker or solder braid).

If that's beyond your capabilities, you'll have to enlist the help of a service technician or a good friend you trust with those skills. Even more importantly, you WILL unequivocably void any warranty remaining on your C-128, if you do this upgrade. So beware...you may want to

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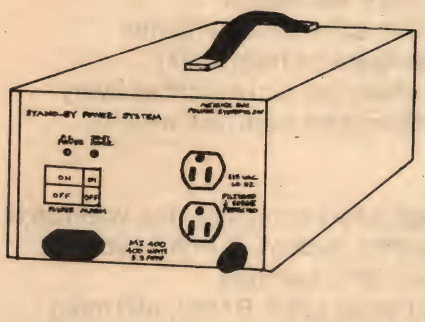

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RAM Consideration

Whew! Now that that's over, let's continue. To do the upgrade, you'll need, of course, two new 64K RAM chips. They need to be of the 64Kx4 bit variety, NOT the more common 64Kx1 bit configuration. What you are looking for are 4464 compatible chips, not the usual 4164s. (These latter chips are much more common and are the ones usually used by C-64s, IBMs, etc.)

There has been some discussion as to what speed rating the new RAM chips should have. Most of the chips used by Commodore are 120 ns. Yet, there are many who have done this upgrade who are now using 4464 chips rated at 150 ns (including me). Perhaps the best advice is if you can get 120 ns. chips for about the same price, buy them. Otherwise, you will probably be fine with 150 ns versions.

The 4464-type chips are available from a variety of *Computer Shopper* advertisers including Jameco, JDR, and MicroProcessors Unlimited. You'll find that part numbers and prices vary widely. For example, a recent look at the JDR ad shows the TMS4464-15 chip for $6.95 each, while MicroProcessors Unlimited is selling the Hitachi HM 50464-15 (4464-compatible) for $4.20 in single lots. Check the advertiser's index for other ads.

Disassembly Instructions

To install the new RAM chips, you have to get at the C-128's motherboard: After removing the six screws on the bottom, the case can be gently popped open into two separate parts. (Be careful not to use too much force or you may damage a connecting cable.) Carefully disconnect the power LED and keyboard connectors, and remove the screw on the motherboard holding the keyboard grounding strap. The metal shielded motherboard is held in the bottom plastic case by five screws; remove them and take it out as a complete assembly.

Begin to remove the metal RFI shield by twisting the metal retaining tabs around the shield's edge and doing a little desoldering at one point on the right side of the board. After removing the one large screw remaining on top of the shield, it will come off. The motherboard will then be exposed, and the bottom part of the shield is removable.

Doing The 8563 64K Modification

Using Figure #1 as a guide, find the metal enclosed video section on the upper left side of the motherboard (it's covered by a lid with a lot of holes in it). This lid comes off to reveal the two main video chips (8563 and 8564). The left side of this area is the 8563 and by looking at the board printing, you can identify U23 and U25 which are the two 4416 16K RAMs. These two will be removed and replaced, so carefully unsolder and remove these chips.

Now install two high quality 16 pin DIP sockets into the old RAM locations. (DO NOT directly solder the new RAM chips in! If you do, you are outright BEGGING for trouble!) Then insert the 4464 RAM chips into the sockets. (Remember to observe proper static electricity control at all times, especially when handling the RAM chips!) Make sure that pin 1 of the chips is oriented correctly, and replace the metal lid on this section.

You can now either reassemble the computer, or (carefully) re-attach the keyboard connector until you have tested the new RAM. The next step is to test the system by powering up in the 80 column mode. You should see a random pattern on the screen as the video RAM is tested, and then the C-128 BASIC sign-on message should appear. From that point on, there should be no noticeable difference in video appearance or performance. If the normal 80 column video doesn't appear, or there is a garbled picture, don't panic. First check the 40/80 column key, and make sure it is down when you power up.

If there are still problems, you will have to recheck your work to make sure there are no solder bridges or pins left unsoldered on the DIP sockets. If all else fails, replace the 16K RAMs and retest. (You will probably have to first straighten out the pins on the 16K RAMs before inserting them into the new DIP sockets.) If the video is fine with the 16K chips but not the 64K, you can assume that the 64K chips are bad.

Software Considerations

As stated earlier, the extra 48K of video RAM is not automatically accessed by existing software. But, it can be easily used by new software which is aware of it's presence. Since many 8563 programmers are now making this the same modification, it shouldn't be long before we'll see programs that accesses this extra RAM.

For those of you who want to start programming the extra RAM right now, here's some of the basics: You should already have a good handle on the basics of the 8563. (If you aren't up to speed yet, then start by studying Chapter 10 in the *C-128 PRG* first.) The main thing you have to remember when using the extra RAM is that it maps differently into the system than the existing 16K, due to the way that the 8563 generates RAM addresses.

On power up, the 8563 assumes that 4416s are hooked up, and so it will multiplex its address lines for the 4416 chips. In this mode, the 4464s will appear to be equivalent to the 4416s (and thus are software compatible). But in order to access the extra RAM of the 4464s, we have to tell the 8563 that 64K is now connected.

This is done by setting bit 4 of the 8563's register 28 high. I call this the 64K bit. When this bit is set, the 8563 will

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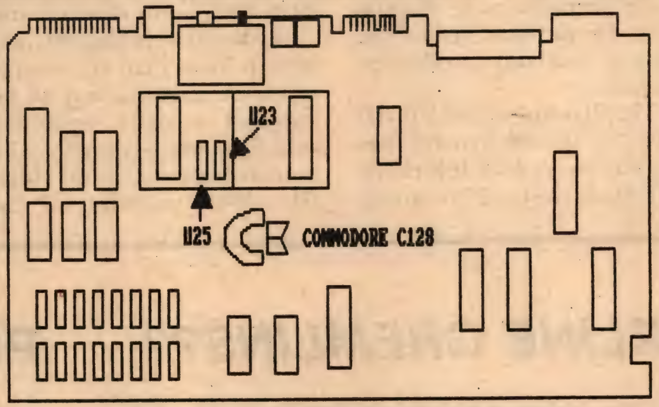

(Figure # 1 - C-128 Motherboard Layout Diagram)

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Inside Commodore

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multiplex addresses for a full 64K, instead of just 16K. However, when the 64K bit is set, the 8563 expects to interface with 4164 (64x1) chips instead of the 4464 (64x4) versions. Since these two chips are a little different, it shifts the physical addressing scheme around a bit. (See the *C-128 PRG*, Chapter 10, pages 332-333 for more info.) This shifting causes a slight problem in that the 4464s will no longer be completely software compatible with the 4416s.

Any part of a 4464 RAM that's been initialized BEFORE the 64K bit in register 28 is set, will effectively disappear. (It's actually still there, it's just been garbled beyond all comprehension.) The 4464 RAMs will have to be re-initialized again, AFTER the 64K bit is set, in order to be effective. Also, while in the 64K mode, if a RUN/STOP-RESTORE occurs, or the Editor ROM's CINT routine is called, the 8563 will be reset for the 16K chips. You'll have to reset the 64K bit and perhaps even re-init your own display RAM areas again in the 4464.

I've included a short program in Listing #1 that gives you an idea of how to set the 8563 up for 64K. This program initializes the 64K RAM to work in the normal 80 column text mode. First the program creates, and then calls, a short ML program to switch the 64K bit ON in Register 28. Next, it calls the ROM screen editor INIT80 routine to set up the RAM based 80 column character generator in the 4464. Finally, it prints a CLR/HOME ASCII character, CHR$(147), to automatically clear out the screen RAM and attributes area.

By using the routines in this program, you will have room for not two, but 14 text screens, with attributes, in the 80 column text mode. If you don't need attributes, you can have 28 different text screens. Or you can also configure two text screens with attributes, and up to 7 character generators. In the graphics mode, you can now have up to 4 full bit-mapped screens. Or, you can also have two bit-mapped screens, with FULL attributes. I leave the rest to your imagination, for now.

Comments On Commodore's C-128 CP/M Plus Technical Documentation

Although it's been sitting around here for quite a while, I just recently started digging into the additional CP/M Plus utilities and documentation that Commodore is selling for the C-128 system. (I'm referring to the extra cost manual and utility/source code disks that are available to registered CP/M Plus owners for $19.95.)

When I heard about this good deal(?) from Commodore, I had some reservations. Here was Commodore charging an extra $20, for what were supposed to be standard CP/M Plus utility programs and user documentation. It seemed to me that this all should have been part of the basic C-128 package. At first I thought it was just another way for Commodore to squeeze a few extra bucks out of its customers. But, I sent my $20 (plus shipping) in anyway and sat back for the customary 8 week wait. When the

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```
10 REM  INITIALIZATION ROUTINE FOR 8563 64K RAM
20 REM  SET UP RAM FOR USE WITH TEXT MODE
30 REM
40 BANK 15                     : REM SET UP RIGHT BANK FOR ROM ROUTINES
50 GOSUB 110                   : REM INSTALL 8563 WRITE ROUTINE
60 SYS DEC("1300"),63,28       : REM SWITCH 8563 TO 64K
70 SYS DEC ("C027")            : REM CALL EDITOR INIT80 ROUTINE
80 PRINT CHR$(147);            : REM CLEAR SCREEN RAM
90 END
100 REM INSTALL 8563 REGISTER WRITE ROUTINE
110 FOR AD=DEC("1300") TO DEC("130B")
120 READ A$
130 POKE AD,DEC(A$)
140 NEXT
150 RETURN
160 DATA  8E, 00, D6, 2C, 00, D6, 10, FB, 8D, 01, D6, 60

READY.
```

(LISTING # 1 - 8563 64K RAM INIT ROUTINE)

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Inside Commodore

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package arrived, I gave it a quick glance and then filed it in my long term projects closet.

It's (Almost) All There!

Well, after finally getting the time to study what I got for my $20, I'll have to say I was impressed. Along with the extra (ahem) CP/M Plus utilities, Commodore threw in the complete commented source code to their BIOS and the Z-80 Boot ROM. And along with the user documentation, they even added the CP/M Plus System Guide. Although it's essential for creating a new BIOS, this manual is normally only available to OEM system programmers.

Could this be the same Commodore that deleted major sections of the BIOS listings in the C-64's CP/M cartridge manual because they felt it was too revealing? When Commodore decided to open up the C-128 for CP/M hackers, they sure didn't hold back!

(But...A Vital Omission Noted)

All the time I was exploring this little bundle from West Chester, I had a sneaking suspicion that somehow it was too good to be true...something had to be flaky somewhere. As usual, my hunch was right...Commodore made an extremely important omission in the documentation. (What else is new?)

I'm referring to the missing CP/M Plus manual entitled: *The Programmer's Utility Guide for the CP/M Family of Operating Systems.* As the User's Guide points out (on page iv), it's one of the three standard CP/M Plus manuals. They are identified as the *User Guide*, the *Programmer's Guide*, and the *Programmer's Utility Guide*.

The reason this is such an important omission is because the *Programmer's Utility Guide* includes all the detailed instructions for using the programming utilities included with the CP/M Plus package: the MAC and RMAC assemblers, and the LINK and LIB utilities. Without this guide, you can learn all you want about the inner workings of CP/M Plus, but you can't use the powerful programming tools included with it!

I'm not totally sure why Commodore made such an important omission. Perhaps it was because there wasn't room for both the *Utility Guide* and the *System Guide*. They may have felt the *System Guide* was more important, but for those of us not overly well-versed in MAC and RMAC, that's a matter of personal preference!

There has been no announcement by Commodore on when or if they will ever supply this missing manual to CP/M Plus users. There's a possibility they will sell it as (yet another) extra cost item. I think registered CP/M Plus owners who have purchased the extra utilities should be entitled to a copy of this *Utility Guide*, but we'll have to see. I'll keep you posted on what happens in future columns. If no one wants to cooperate with us, I may even try to write a book on the subject myself. (I'm also checking into the possibility of getting that manual straight from Digital Research.)

Late News Of Interest New C128/1571 ROMs Coming

Commodore has quietly been developing some new ROMs for both the C-128 and the 1571 drives. While they've been keeping pretty mum about the subject, most authorized service centers should have these new ROMs after the first of the year. There's no word yet on how current end users will be able to get these ROMs, but independent chip suppliers like K. Boufal Consulting will undoubtedly be carrying them (address at the end of this article).

The new C-128 ROMs are still sort or mystery. The current C-128 ROMs (until recently) were considered stable versions, and relatively bug free. (Some very early C-128 firmware did have some minor bugs, but that was fixed long ago.) Expect to hear more on these new ROMs in future columns.

It IS clear that the new 1571 ROMs will fix some of the known DOS bugs. Specifically; the infamous SAVE with replace bug (S:@) and the problem with large Relative files (over 170K). One rumor floating around is that a future 1571 ROM will be modified to include a fast SAVE routine to complement the fast LOAD mode. (As you may recall, while the 1571 can LOAD files many times faster than a 1541, it's not much quicker for SAVEing files.) It doesn't appear that latest ROM version has this feature yet.

RAM Expansion Modules 1700 vs. 1750 vs. 1764

Commodore's RAM expansion modules for the C-128 appear to be selling quite well. Recent price reductions have made them more affordable, and it's probably only a matter of time before they are considered standard equipment by serious users.

Currently, the price difference between the 128K RAM pack (the 1700) and the 512K version (the 1750) is only $30-50. That's not too far away from the price difference in the RAM chips. While the 1700 may continue to be available for a while, it's expected that the 1750 will eventually become the dominate version.

It was previously reported that the 1700 and 1750 would work with the C-64. Well, there is now at least one BIG disclaimer surrounding that. While the RAM packs will technically interface with the C-64 expansion bus, the 1750 can cause trouble. Because the 256K RAM chips in the 1750 draw about an amp of power by themselves, it can easily overload the already weak C-64 power supply. If the power supply goes, it can take out several chips in the C-64 and the 1750 in just a few seconds! If you are using a third party power supply on your C-64 capable of supplying an additional amp of 5 volts, then this shouldn't be a problem. (There may be some other unspecified problems when using these RAM packs on a C-64, or at least Commodore has hinted that there are some.)

Commodore has now announced that they are working on a separate RAM pack for the C-64, dubbed the 1764. This pack is supposed to ship sometime in early 1987, which means we MAY see it before Summer. While the exact configuration of this new C-64 RAM pack isn't known yet, it may either be a re-worked 1750 that uses CMOS chips for less power, or a 1750 bundled with a new power supply that will be able to supply extra cur-

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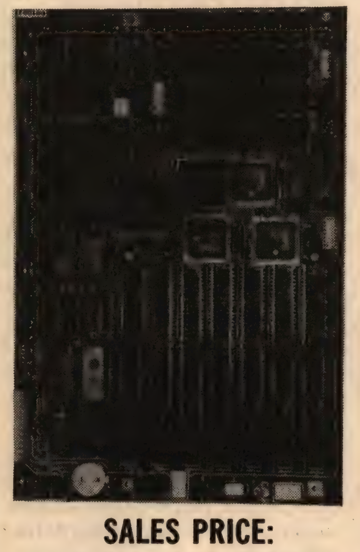

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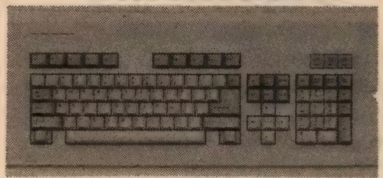

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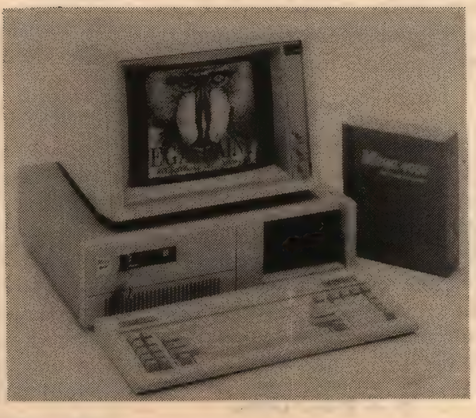

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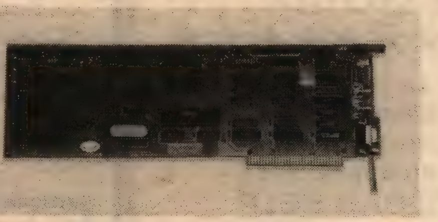

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Inside Commodore
continued from page 210

rent needed. Let's hope it's priced reasonably enough to make it successful.

1750 vs. C-128 (Rev. 6) Motherboard

You may recall from previous columns, the C-128 motherboard has been through two major revisions so far, Rev. 6 and Rev. 7. It's reported that the 1750 module is not totally compatible with the early Rev. 6 motherboards. However, Commodore will upgrade your Rev. 6 motherboard to a Rev. 7, free of charge, if you purchase the 1750. If you've already got a Rev. 6 board, for under $200, you now can get both 512K more RAM, and a new motherboard!

By now, you may want to know if you have a Rev. 6 board or not. To be positive, you will have to take the motherboard out of the C-128's case, and remove the metal RFI shield (see the instructions in this month's hardware project). The version number is on the solder (back) side of the motherboard.

At the expansion (cartridge) connector area, you will see either #310381 Rev. 6 or #310381 Rev. 7 etched into the board. According to company sources, only a few thousand Rev. 6 boards ever were shipped, but if you have one, it sounds like a good deal. (Contact your local Commodore service center for more details.)

Some Loose Ends...

When you write a monthly column that covers many different subjects, as this one does, every once in a while, you have to do some journalistic housekeeping. Some items have been piling up that I need to take care of, and this is a good place to do it.

JCT Hard Drive

In our Sept. '86 issue, we reviewed two 64/128 hard disk systems, one of the drives was manufactured by JCT, Inc. I mentioned that another party, DEBNC, was supplying software and interfaces for the JCT hard drives, and gave a phone number and address for the company. Now DEBNC has been merged into JCT and they both have the same phone number: (503) 474-5678. All the phone numbers for both DEBNC and JCT in the Sept. '86 issue are wrong, so please don't use them anymore. (They've had dozens of people calling their BBS number thinking it's corporate headquarters!)

Timeworks C-128 Software: The Controversy Continues

Over a year ago, way back in late 1985, I commented that I had a quick look at the (then) new Timeworks C-128 software line (WordWriter 128, Swift Calc 128, and Data Manager 128) and they appeared to be greatly improved over the earlier C-64 versions (which I had tried years before and was quite less than impressed with). After those comments appeared, I received letters that took issue with my comments from some dissatisfied Timeworks customers.

In the April '86 issue, I wrote a small section (four paragraphs to be exact) in this column entitled, Timeworks C-128 Software Retraction. Mentioning the bad reports I received, I retracted my previous enthusiastic endorsement. My final comments were that readers should try the programs for themselves before making a final decision, either for or against the software.

Those comments didn't appear to set well with Timeworks and some of their dedicated customers. A couple of letters were sent to Mr. Glenn Patch (Chairman of Patch Publications), stating I was incompetent for complaining about the software and that any reports about bugs couldn't possibly be true.

After this, Timeworks offered to let me review their C-128 software for a more extended period, sure that I would change my mind. Since I really hadn't had the time with their C-128 programs to make up my own mind, I decided to take them up on it.

To (hopefully) close the book on this matter, let me state that after several months of trial use, I found the Timeworks C-128 programs mentioned above (WordWriter, Swift-Calc, and Data Manager) to be fairly good programs. I still feel that the current C-128 versions are vast improvements over the earlier C-64 software and Timeworks appears to be honestly committed to both improving their products, and supporting their customers in a reasonable manner.

Does this mean that I'm endorsing the Timeworks software? Not necessarily. For example, I definitely do not like the way that WordWriter 128 reformats the text. I'm not crazy about the way it handles on-screen margins either. But, that's a personal matter. And whether you should purchase the program or not should still be a personal choice.

If given a choice, I would probably take the Precision Software products, SuperScript 128 and SuperBase 128, over the Timeworks line. But I know others are sold on the Timeworks programs, and still others who prefer Digital Solutions' Pocket Writer and Pocket Filer, etc. Again, I think it's a matter of personal preference.

In any case, I retreat to my former recommendation that you try this software out, if possible, before you buy it. But not because it's buggy...it's not. Try it out because you should try out ANY software that you invest in which costs more than just a few dollars.

And if you disagree with this, I would appreciate it if you would please direct at least a copy of your complaints about it to me, personally. How else am I going to keep track of when I'm being incompetent?

Products Mentioned In This Column

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for each module, thereby allowing up to 128 timer events, with proportional control from 10-100% in 10% increments. If you are looking for a simple and convenient computer control system to manage your power load, control lighting sequences, or operate your appliances automatically according to the pattern you choose, this is surely a "best buy" for you. Cost varies, with some mail order sources quoting the interface, cable and software at $49.95. Modules vary in cost from $12 or so to $20, depending on the source.

The emergence of quality software and specialized hardware for serious "productivity" applications on the C-64 and C-128 computers mark important changes in the use of these machines in the home. While entertainment and education remain key areas for Commodore, these more routine and truly helpful uses herald the acceptance of the computer as an "appliance" which will become a necessity rather than a toy or luxury item. In our opinions, these products represent a big step in that direction.

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MIDI Magic: QRS Digital Music, 1026 Niagara Street, Buffalo, NY 14213.

BASIC 128: Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510.

X-10 Powerhouse: X-10 (USA) Inc., 185A LeGrand Avenue, Northvale, NJ 07647 ●

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not used. The Data and Printer Control Ports are considered outputs only, although their output can also be read. The Printer Status Port is a read-only port, and receives status information from the return lines from the printer.

The parallel adapter is normally configured to decode starting at port address 378h. But jumpers on the board can also be cut or closed to move it to either 278h or 3BCh. (The monochrome display adapter circuit is always configured to start decoding at port 3BCh.) This allows you to have up to three parallel adapters in a single PC. (The ROM BIOS routines automatically search for and software install these printer adapters on boot up.)

The Data Port

The first port on the adapter (Port A) is the Data port. It's composed of two LSTTL chips. On a write operation, an LS374 octal latches the bus data lines to provide an 8-bit data output port. These lines are then terminated in the DB-25 female connector at the end of the adapter card. This forms the byte sent as character output to the printer over the Centronics data lines.

On a read operation, an LS244 input buffer provides an 8-bit input port. This allows the computer to read the real-time status of the 8 output lines coming from the latch. This lets you verify the actual output data going to the printer and whether the latch is functioning properly. It's also used by the ROM BIOS to detect the presence of the display adapters at boot up time.

This port was apparently not meant to ever provide bi-directional I/O capability, contrary to some reports. While at first glance, this combination of chips would seem to provide an 8-bit bi-directional I/O port, a little more analysis reveals that this is not so, only the latch output status can be read reliably.

The problem is that the output of the data latch is always connected to the data lines of the interface and those lines are always being driven either high or low by the LS374 latch. In order to read data put on the lines externally, it would first be necessary to electrically disconnect the latch output to avoid bus contention.

It's slightly ironic that the LS374 latch used on this port is a tri-state device and fully capable of this disconnection. It's this fact, however, that makes this simple modification possible. With just a single jumper, this port can become a selectable input or output. (Just why IBM didn't take advantage of this obvious feature can only be speculated on.)

The Printer Status Port

The second port (Port B) is the Printer Status port. It is defined as read-only and uses part of an LS240 input buffer to read the real-time status of the input lines coming in from the printer. For general interfacing applications it's usuable, without modification, as an unlatched 5-bit auxilary input port. For the PC2COM project, we will be adding a latch to one of the input lines (ACK-bit 6). More details will follow.

The Printer Control Ports

The last port (Port C) is also a one-way output port, with some provision for reading the output lines through a buffer (just like the Data port). The output port here consists of an LS174 hex latch. Four of the outputs are used for printer control and one line is an internal software interrupt control bit. The four printer control lines are driven through open collector buffers and run directly to the DB-25 connector. Notice that there's still an unused bit in this output latch (bit 5). We'll be getting back to that shortly.

On a read operation to this port, the circuit puts the lower five bits of the latch output on the data bus, allowing for data verification. Unlike the Data Port, the LS174 latch used here cannot be easily tri-stated to make this port bi-directional.

The Interrupt Control Circuit

Part of the parallel adapter circuit missing from the block diagram of Figure 1 (page 105) is the Interrupt Control Circuit. This circuit uses one of the Printer Status input lines (Acknowledge or ACK for short) to optionally generate a hardware interrupt. This input line is logically ANDed with a bit that can be set or cleared in the Printer Control register (bit 4—refering to Table 1 page 105).

When that interrupt control bit is high, then a low pulse on the ACK line (which is defined as active low), will do a hardware IRQ7 on the PC-bus. Theoretically, this would allow for interrupt driven printer buffers and spoolers, but there are a few problems with this, as we'll see. We will use this line, modified as described later, as a data input latch signal.

The DB-25 Connector

All 17 active lines, along with a common ground, terminate in a DB-25 connector at the back of the connector. The pin definitions for all these lines is summarized in Table 2 (page 105). In total there are normally 12 output lines, and 5 input lines.

Making the Modifications

Now we are finally ready to make the board modifications. Just to review, our modifications will make the Data port into a true bi-directional I/O port. We will use the unused output bit of the Control port (bit 5) for a software switch to select the Data port as either an input or output port. We'll also by latching the ACK bit in the Printer Status Port.

Included with this article are Figures 2 and 3 (page 105) which are partial schematics showing how the specific modifications for two cards: the basic IBM adapter, and a popular Taiwan clone parallel adapter board which sells for about $25. This clone boards is available, unmodified, from Computer Parts Galore, a well-known supplier of many inexpensive PC-clone boards. (Their complete address is at the end of this article.)

Be aware, however, that the specific schematic references which are made here will probably be different from the board you are using. I will try

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to provide enough information so you will be able to make the same mods to just about any equivalent circuit. If you are using a non-IBM parallel adapter, you will have to consult the schematics provided by the respective manufacturer, or study the board traces, as mentioned previously, to make sure these mods are valid for your board.

Turning O into I/O

Our first modification will be to make the Data port into a true software selectable bi-directional port. This modification is so simple and obvious, you wonder why it wasn't done by the original board designers in the first place.

Just disconnect pin 1 of the LS374 output latch from ground (by cutting a trace on the board) and reconnect to the unused bit in the Printer Control port output latch (pin 15 of the LS174 on the IBM board and pin 7 on the CPG board). Make the connection between the pins by soldering with a short jumper of 30 gauge wire (wire wrap wire is perfect).

By refering back to Table 1, you will see that bit 5 of the Control Port now becomes the data direction selector bit for the Data port. You now have software control over the Data port, allowing it to be both a latched output port, or a buffered input port, by setting the status port bit 5 either low or high. When bit 5 of the Control port is low, the output latch is connected. When high, a read to the Data port inputs the actual external data coming in.

The Need For A Control Line Latch

If you are polling data occasionally from an outside source, and all you need are some bi-directional data lines, then the above modification will probably be all you need. But, if you are working with a more intelligent peripheral that can send data back to you and signal when it's ready, you more than likely will also need some type of control input line that can be latched.

The perfect solution for this application has already been mentioned. It's the ACK (Acknowledge) line. In the Centronics interface, it is defined as an active low line that the printer uses to signal a byte taken during data transfers. Not only is it an input, but on the IBM adapter, it's already set up to generate hardware interrupts (with software enable or defeat as already described). There is only one problem with it. Like all the other Status input lines, it's not latched.

This is a problem, for two reasons. First of all, if it's used as a general handshaking line, the outside source is responsible for keeping it low until the CPU responds. Otherwise, if just momentarily pulsed, the signal will be lost. Even in the Centronics standard, this line only goes low for 10 to 13 microseconds. If the CPU isn't constantly polling the line, it probably won't see the ACK pulse.

It appears that IBM thought to overcome this by allowing this line to be a hardware interrupt source. But, again, the lack of a latch is a problem. If the line is pulsed low and generates an interrupt, the CPU has to acknowledge it before it goes high again, or the interrupt won't be registered properly inside the 8259 Interrupt Controller chip. And since the CPU can be held sometimes up with other things, and won't immediately acknowledge the interrupt, it can be lost.

Adding A Input Line Latch

So, in order to prevent this problem, (and also to allow for an input latch to signal Data Ready for polled applications), we are also going to add a latch for the ACK line. Fortunately, a simple 74LS74 chip can do the trick. It is a very common TTL part and is available from numerous mail order sources for about twenty five cents. You will have to add the new IC, cut a board jumper, and run some jumper wires (again, wire wrap wire is a good choice). Refer to Figures 2 and 3 for reference, as the modifications are explained.

The easiest way to add the new LS74 is by piggybacking it to an existing 14 pin chip on the adapter board. This can be done by bending all pins except #1 and 14 up away from the LS74 IC's body. Next, find a 14 pin IC and orient the latch the same direction (pin 1 aligned on both). Finally, carefully solder the LS74's pins 1 (ground) and 14 (Vcc) to the IC underneath. (On the CPG board, I found U6, a 74LS04 buffer, to be a good choice for the piggyback.) Run a jumper from pin 2 to ground, also.

Next, you will have to cut the jumper coming from Pin 10 on the DB-25 connector. You will splice into this line, as shown, connecting pin 4 of the LS74 to the DB-25 side, and pin 6 to the incoming side.

Now run a jumper to the LS74 pin 3, from somewhere along the line incoming from the PC-bus connector B2 (RESET). Make sure you connect to it before it gets to the first IC. Run another jumper from the line running between the Data Latch output (the LS374) pin 11 and the address decoder chip. (This is known as the Write Port A, or WPA line, as described earlier.)

Theory Of The Latch Circuit

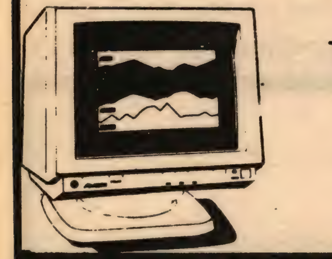
The latch circuit now forms an RS flip flop with dual reset. Since ACK is active low, we are using the complementary output of the latch, instead of the normal one. On power up reset, the rising edge of the PC-bus reset line clears the internal ACK sense line. An incoming ACK signal will set the complementary output low. When Port B (Status Port) is now read, it will reflect the last level change on the ACK line (assuming the latch was reset).

Any write to Port A (Data port), will automatically reset the latch. If this line will be used primarily for an input sense line, Port A can still be an input, and the write to clear the latch will not affect any data on those lines (since the output latch is tri-stated).

Summary

This circuit was designed to allow for easy set and reset of the latch, while not interfering with the normal operation of the adapter circuit as a standard printer interface card. No problems have been experienced when using these modifications with a wide variety software and printer buffers. If you are looking for an inexpensive I/O port for your PC-compatible, and already have the necessary printer card, it couldn't be any more affordable!

Products Mention In This Article: Product: PC-compatible Parallel Printer Adapter Card, Price: $23.95 (plus S&H, prices subject to change), Vendor: Computer Parts Galore, 56 Harvester Ave., Batavia, NY 24020; 1-800-431-9008, 1-716-343-6133 (in NY). ●



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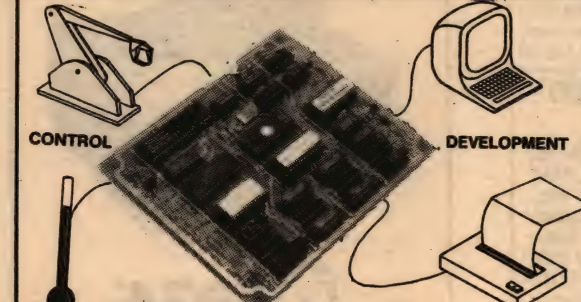

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Logistix and Superbase Personal

Dongles Descend on the Amiga

by Ervin Bobo

While we can understand the reasoning behind copy protection of computer disks, we can't quite understand why dongles are sometimes thought to be a solution to the problem. Since this is the one common feature of Logistix and Superbase Personal, we thought it should be discussed up front.

If you're fortunate enough to have never been plagued by dongles, they are a sort of null device that plugs into the second joystick port of your computer. While the programs themselves are freely copyable, and may be installed on a hard disk, without the dongle in place they will not run.

Therefore, if the dongle should become lost you're in a position every bit as severe as you would be if your only copy of a program became trashed; you're going to have to seek a replacement and time is going to be lost in the process. Nor are dongles interchangeable: you can't use the dongle from Superbase to run Logistix while you're waiting for a replacement to arrive in the mail.

Because both of these offerings from Progressive Peripherals and Software depend on the presence of the dongle, we are somewhat dismayed. Productivity software cannot produce while you're waiting for a replacement disk or dongle and we wish the producers had relied on the complexities of the programs and the documentation necessary to understand the complexities as a defense against casual distribution.

Logistix

In the case of Logistix, the documentation is a loose-leaf binder of about two pounds—comparable to the book on Lotus 1-2-3. Because it is a program designed for several computers, documentation is general and I was quite a ways into the book before I found the few pages pertaining to Amiga-specific instructions. Once found they were invaluable (though one important routine does not work and there is no errata to explain why it does not).

Comparisons to Lotus 1-2-3 being an inevitable part of reviews on integrated programs, we'll dispense with that first. Logistix is Lotus-like in it's use of menus and submenus: At the bottom of the screen, a directory is invoked by pressing the "/" key. The directory is the alphabet and each letter represents the first letter of a command or routine: place your cursor over the letter and, on the next line, an explanation of the function appears. Pressing "Return" brings up your selection along with any sub-choices pertinent to your selection.

Once you have the hang of it, functions can be called up more quickly by pressing "/" and one or more letters, bypassing the menu.

Being an integrated package, Logistix offers a spreadsheet, database and chart generator. When a chart is called up or created, it runs in a Workbench window and this is one of the two parts of the program to use any of the Amiga's unique operating features. (The other is multitasking and the Logistix window can be pulled down so that you can see the other task. In a 512K machine, multitasking is unlikely).

Besides the three functions common to integrated programs, Logistix adds a time and task planner in which you use the spreadsheet form to schedule projects. In using such a function, the various parts of a project can be seen in relation to one another (Task B must be completed before Task C can begin; Tasks E and F can be concurrent but both must be 50% complete before Task G can begin; etc.) and in relation to the total time frame allowed for beginning and completion of the project.

To help you to wend your way through a project so planned, Logistix will also perform "critical path analysis" which does just as it's name implies: centers your attention on the critical tasks while ignoring the less important phases.

As a database, Logistix is again conventional. The database is created on the spreadsheet page, with each record occupying a line, the fields running left to right. Each record may have up to 64 fields and each file may contain up to 2047 records. Key fields for sorting may be set, but only one at a time. If you wanted to do a sort that was "three deep," it would consist of three separate sorts with a different key field specified for each one—unlike most dedicated databases, which will perform the three sorts concurrently.

As a spreadsheet, the size of Logistix is 1024 columns by 2048 rows and this makes it quite respectable. The number of cells to be used in a given application will depend upon the size of each cell and upon the memory in your Amiga. Running the program from CLI on a 512K machine leaves you with about 94K available for a worksheet.

The default sheet consists of twenty rows of cells. With one megabyte or more of memory, two other modes are said to be possible: one of them, called Extended Logistix, uses the 640x400 resolution (interlace mode) to give you 44 rows. Though I use a memory expansion, neither of these special routines could be called up on my computer. The problem lies in the fact that the Extended program is on the demo data disk. Instructions call for copying it onto the program disk which would be fine if only there were enough room.

Trying to run it directly from it's own disk does not work, for it cannot find the lgx.ins file it needs (because that file is on the program disk). Now, before you point out the obvious—that I should try copying the lgx.ins file to the data disk—let me point out that I don't feel I should have to rebuild software in order to use it.. Nor should you. So there.

As to charts, there is good news and bad news. Using those charts included on the demo disk which is part of the package, I ran through the spectrum and was impressed in all respects save one: The legends on the charts were too small to be readable and my attempts to resize the chart window were futile. Referring to the Amiga-specific section of the documents, I found that a lack of contiguous memory prevented the window from being made larger. With Kickstart 1.2 and the memory expansion, this problem dissolved but we feel people without those tools are going to be less than impressed by the chart feature.

In printing a chart, the opposite is true. Logistix works from it's own internal list of printers and allows selection of printer, page length, and output port—as well as allowing similar selections for plotters. Selecting a printer fills in the other blanks with default values and you're ready to go. The charts shown here (Figures 1 and 2 Page 220) were printed to the full size of a page with extremely clear type in a few fonts you may not have seen before. Shading for the black-and-white printout was an operation performed

continued on page 220

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Amiga Workbench continued from page 107

color. The color choice indicates whether that cell is occupied by a label, number, formula or note. Clicking on any cell will designate that cell as the new "home" (uppermost left) cell.

Up to five lines of text notes (about forty words) can be created for cells in your worksheet. These are accessed by selecting the cell and then pressing the Help key. Though using this feature to excess will eat up your RAM, it could be a good reminder of how you arrived at a particular formula or why these particular figures were included.

Though there is no split screen feature, duplicating your worksheet in another window and then designating a new "home" cell will give you an approximation of split screen, though you will have to flip back and forth (or resize the screens).

MaxiPlan is probably unique in that it can be fully used with only the mouse (except for entering labels), though most users will probably prefer keyboard entry of numbers. The command bar above the worksheet lists math operators, numbers from 0 to 9 and a box labelled Names. Click on Names and the screen changes to show you a table of math functions such as Sum, Average, Date, Sqrt, Exp and about fifteen others.

Click on one of these and the beginning formula is entered on your worksheet. Clicking on Sum, for example, would result in the entry box of the worksheet displaying the formula " = SUM( )." Your cursor will reside within the parentheses and you can complete the formula either by entering numbers through the keyboard or by dragging your cursor over the range of numbers to be added.

I don't find this method any faster than keyboard entry, but what it does do well is to supply the occasional user with formulas and syntax that might otherwise have been remembered incorrectly.

Another feature of MaxiPlan that I'd not seen elsewhere (except for MultiPlan on the Macintosh) is the ability to superimpose a grid on the worksheet. Besides putting each number in its own box for easy readability, this feature could be used to create custom charts such as work schedules or check lists. In using the grid, you have the options of printing it or not printing it.

Above the command line, a bar shows you the total RAM and the free RAM, the difference being reserved to operate the system. Free RAM will determine the size of your spreadsheet, which can be as large as 16384 rows by 512 columns. Although I was not able to check MaxiPlan with other add-on memory devices, I did check it out with the aMega board from C Limited. No modifications were necessary to have the extra memory recognized and free RAM was then over 800K—quite respectable.

In addition to functioning as a spreadsheet and a chartmaker, MaxiPlan also has the database function that is becoming common on the more sophisticated programs. Each record is entered in a horizontal format; sorting may be done on either one or two fields and the regular spreadsheet math can operate on columns of numerical data.

In formatting my first worksheet, I was a bit put out at the fact that there were no Global functions. Rather than changing the width of all columns with a few keystrokes, I had to change each individually. Later, I discovered that the Range function could be used—in this, you define a range by dragging the mouse, the selected cells being highlighted, then choose the function you wish to have operating on that range. It still isn't a global function, but it works.

Neither does MaxiPlan offer a macro capability, but an optional disk called MaxiPlan/Macros is available to registered owners for an additional $25.00.

Although the documentation indicates that MaxiPlan is copy protected, the Errata sheet tells you it is not. This means that you can make a working copy and keep your original in a safe place and that you may also install the program on a hard disk.

Documentation is good. With the step-by-step instructions and the demos included on the disk, even a first-time user should get the hang of it rather quickly, making MaxiPlan another good addition to your Christmas list.

MaxiPlan is available from

continued on page 218

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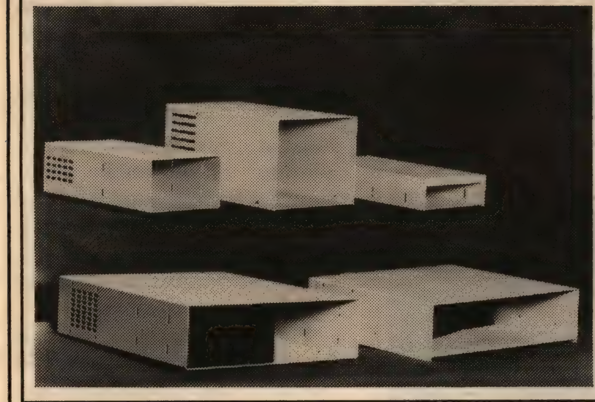

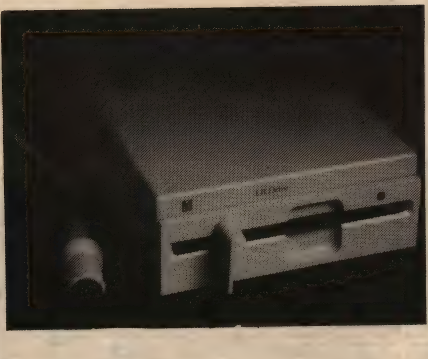

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Amiga Workbench

continued from page 217

Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. Suggested list price is $150.00 and 512K is required.

Speaking again of Christmas lists: if you can't promote a new set of golf clubs, perhaps you'll settle for a chance to play some of the country's best golf courses. And if you'll settle for that, then Mean 18 might be just the thing to find under your Christmas tree. Of course, it will take you away from your family and keep you tied up at the computer for hours on end and you'll probably catch hell for being so involved in it—but isn't that what golf is all about?

Mean 18 is the first Amiga offering from Accolade. I've long been a fan of their games for the C64 because graphics have always been exceptional and most of their programs have been original concepts rather than "me-too" copies. I'm happy to report that their first outing on the Amiga is no exception.

You may select one of four golf courses for play: Pebble Beach, St. Andrews, Augusta or Bush Hill Country Club (your home course) and up to four players may compete. Before playing, you can practice the tee or practice the green as many times as you wish, but once you select Play you're in for the whole course.

Not being a golfer, I'll take it on faith that the legendary courses are as depicted here. As you begin play or practice, a sort of signboard shows you the layout of the fairway, both the pro and amateur distances to the flag and the par score. Study it carefully and get a feeling for the lay of the land, for you are in control of your shot.

At the tee, and in subsequent shots, your viewpoint is from behind the golfer you control and stretching away in front of him is the fairway, complete with trees, sand traps, water hazards and rough areas. Since each hazard is depicted in a different color and texture, it is easy to learn what you're up against.

Just below this picture is information on distance to the flag, name of current player, club selected and a stroke count. In addition to this, left and right arrows allow you to pivot your man a full 180 degrees in either direction.

It takes three mouseclicks to swing at the ball, and your guide to the swing is a thermometer type of gauge at the left of the screen. The first click sends the mercury up in an indication of the amount of backswing; click when you think you have enough power and start your swing; then click again at the spot where you think you should snap your wrists. All is not guesswork here, for markers on the gauge indicate what you should do.

Note that snapping your wrists early or late will cause you to slice and that on some dogleg fairways this can be used to your advantage.

As you get closer to the green (in beginner mode) your clubs are changed for you, though you may override the computer's decision if you wish. Once you are on the green, the viewpoint changes and now you have a bird's eye view of your golfer, the ball and the cup.

In the beginner mode, a line extends from your club toward the cup and arrows at the bottom of the screen allow you to deflect this line to line up the shot—probably comparable to shifting your feet. The length of the putt is shown and the thermometer is still active, so your shot is made in essentially the same way as when you were using the driver and the irons.

A near miss on a shot of ten feet or more will elicit a crowd noice like "oooohhhh." Near misses on closer shots elicit nothing: if you miss from less than ten feet, you're probably considered a bum—I know, because I have done this frequently.

Once the putt has been sunk, you're treated to a view of the scorecard, showing par for the hole and below it your score. This can be a humiliating experience, but it's never been enough to make me want to quit; only to try again. (Par for the first hole at Pebble Beach is four strokes; on my first try, I did it in exactly forty strokes. But I'm getting better. Sometimes I've had this one down to six strokes.)

To use Mean 18 you must load Workbench, then remove the disk and insert Mean 18 in drive DF0:. When you open the window, you'll see icons for the various courses, an icon for the game and one called Arch. Arch is short for architecture and this leads you into a program where it is possible to redesign individual holes on any of the golf courses. See Figure 2.

Icons representing trees, sandtraps, fairway, etc. may be selected with the mouse and painted onto the representation of the fairway and the result can be saved for future use. For myself, I think it would be best if every hole consisted of only a fairway, but you'll have to decide what's best for your game.

In its graphics, animation and sound effects, Mean 18 is a spectacular game. Documentation lacks a bit, being the instruction book written for the IBM version of the game, but the translation to Amiga terms is simple. Though I've had little interest in golf up to this point, I keep coming back to it, determined to do better next time.

Mean 18 is available from Accolade, Inc., 20833 Stevens Creek Blvd., Cupertino, CA 95014 and at a suggested list price of $49.95. 512K is required.

Speaking of K, we have a few updates to the article on the aMega memory expansion board from C Limited.

I am told that the newest version of Deluxe Paint from Electronic Arts will recognize and utilize the extra memory. Since I've not yet seen this for myself, I have no figures on the amount of free RAM available, but it is certainly a sign that things are moving in the right direction.

Animator, from Aegis, will also utilize the extra memory. To do this, you must boot it from CLI by typing "ANI-M." At the prompt, type in "400, 000" and the rest is automatic.

Seeing software updates and knowing that software companies really are interested in improving their products is one of the nicer parts of this job. A case in point is Scribble! from Micro-Systems Software.

Some months ago,I reviewed the first version and found it to be good. Now, with the addition of a spelling checker and a mail-merge capability, it has been made even better. However, they didn't just stop there: the entire program has been fine-tuned for optimal use with Kickstart 1.2—although, if you don't yet have the new version, everything also works well with version 1.1.

The spelling checker contains a dictionary of 30,000 words and you may add new words of your own to an almost unlimited degree. In use, you may check a single word, the words appearing in the current window, or the entire document. When an unrecognized word is encountered, it is highlighted in orange and a requester window appears to give you your options.

You may choose to correct the word, ignore it, add it to the dictionary or take a guess. If guess is selected, the window shows the possible words and, if the correct one is there, you select it by clicking on it with the mouse, then clicking on the "replace" box—at which point it is automatically substituted for the highlighted word.

continued on page 232

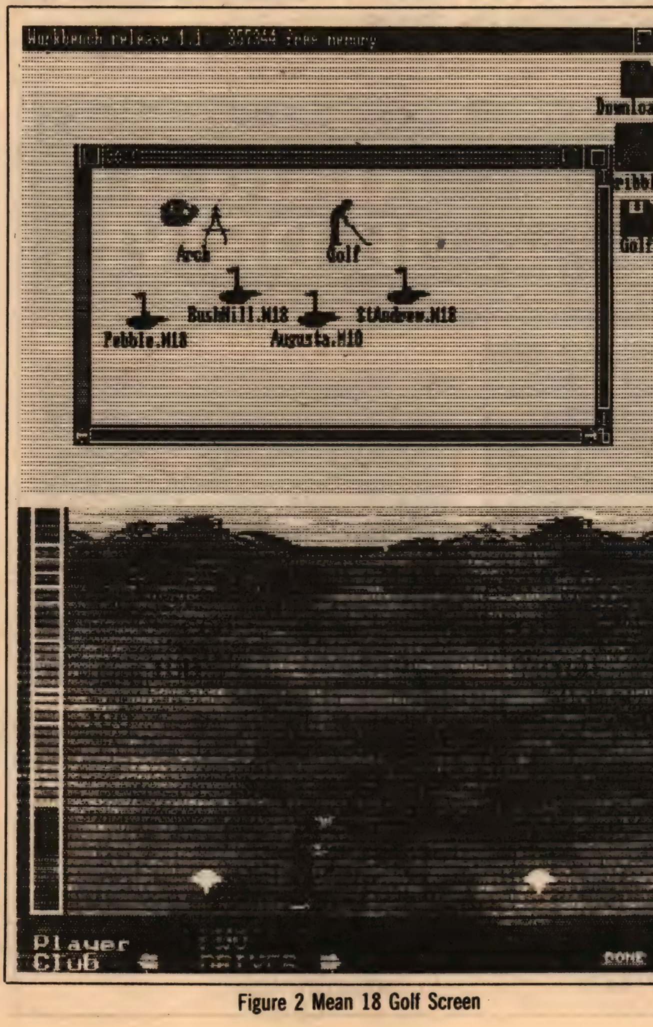

Figure 2 Mean 18 Golf Screen

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The Amiga

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brained operations of number crunching and word manipulation.

The software programs of right-brained computers can also be developed from a different kind of perspective. Rather than building an orderly procedure of logical steps as in traditional programming by the use of sequential commands, the methods can be of a relational and functional approach. Relational procedures are like the linked spatial relationships between figures in a spreadsheet or database. Functional procedures are like the plotted points of an axis on a graph paper which show patterns of relationships. With these methods of programming one could formulate a grouping of patterns to instruct the computer. Such styles might be like the procedures of the computer threaded language FORTH which links together dictionary defined words to program the computer.

The Amiga in its software structure is based on a multitasking operating system, and commonly uses visual display windows, pull-down menus, and instructional screens to portray the various relationships between items, topics, and tasks. Consideration of these unique features of the system's operations could make way for alternate approaches to programming methods.

It should also be cconsidered that the right side of the brain functions in another way, different from the left. The left side is analytical, deducing conclusions from fixation on one point of interest. The right is multifaceted and synthetic, i.e., it puts together many various unrelated topics to come up with something greater than the sum of its parts. This difference is apparent in the Amiga which through its window interface allows the user to focus on many different topics at the same time and to draw them towards a greater interaction and wholeness by relating them together on the screen surface.

The Visualizing Tools

The major interaction visual tool is the window. A window is like a picture within a picture. Windows can be considered as a smaller view contained within a larger screen framework. Their view can be turned on or off as needed. A window may be dragged to another location, resized, or its contents rearranged or scrolled with an ease of spatial movement. Windows can be placed ahead, overlapped, or temporarily behind one another, and zapped from the screen entirely when finished. These are all spatial functions similar to the working of the right side of the human brain in its visual imaging and arranging operations.

These window pictures of the Amiga might be compared to the flowing of inner images commonly experienced in daydreaming. As in dreams one merges quickly from one set of pictures to another series which is quite different, so with the Amiga by multiple windows one can easily transfer focus to various different and yet somewhat related topics. Traditional computers analyze data and draw statistical summary facts from gathered records. The Amiga mirrors multiple scenes upon windowed screens of data showing their relationships by viewing and linking them together. This is similar to the operations of the right side of the brain which uses successive picture images to reflect reality.

Also the Amiga uses pull-down menus. These indicate various potential operations that can be accessed. Along a menu bar the main operations appear and by moving downwards the various subdivisions unfold. Additional sub-divisions can be linked and easily selected from these menus. In this way does the visual relationship of many possible operations appear on the screen for consideration and activation.

Special screens that extend the entire length of the display area report the conditions of the processing. Some can be pulled down, moved in front of one another, overlapped, or pushed behind, and are used to indicate normal processing procedures. Others remain stationary and are used to communicate unique instructions to the user or alert the operator of serious difficulties in processing. Therefore, on a visual interface of time and space is reported the current optional

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Logistix & Superbase continued from page 216

automatically by the printer files of Logistix, a feature we wish were common to all programs.

Although integrated spreadsheets were once the most "gee-whiz" of all computer software, they are by now commonplace. The unique features of Logistix are the Time and Task Planner and the no-hassle routines for printing graphs. If you have a need for such routines then this may be the program you need.

Otherwise, we're bound to point out that at least one other integrated program seemed to us to be easier to use. If what you need is just a spreadsheet, several other choices exist: some with chartmaking and database capabilities; most with full use of Amiga features such as mouse and pull-down menus.

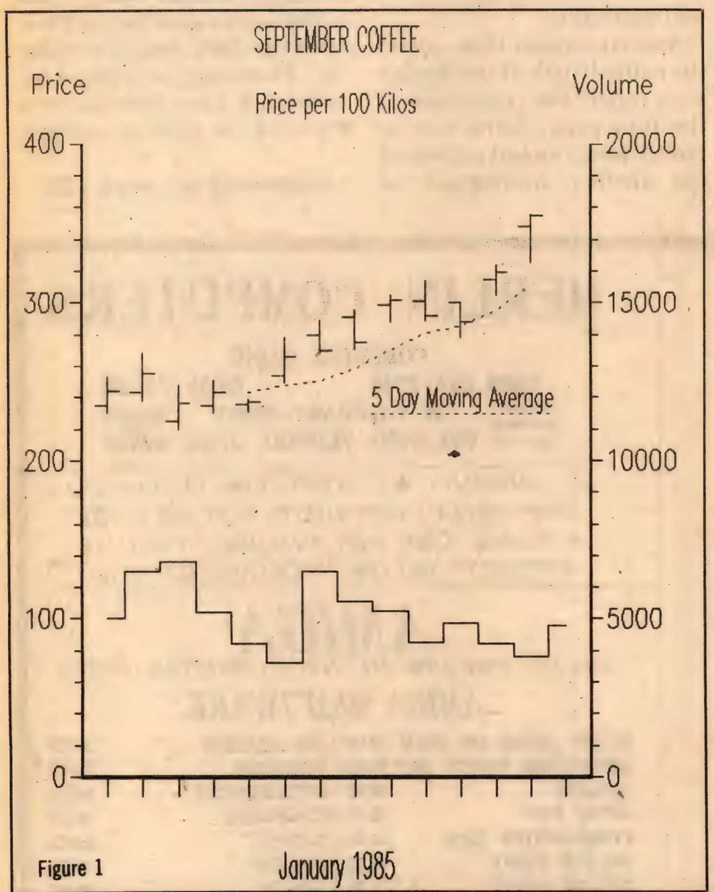

Figure 1

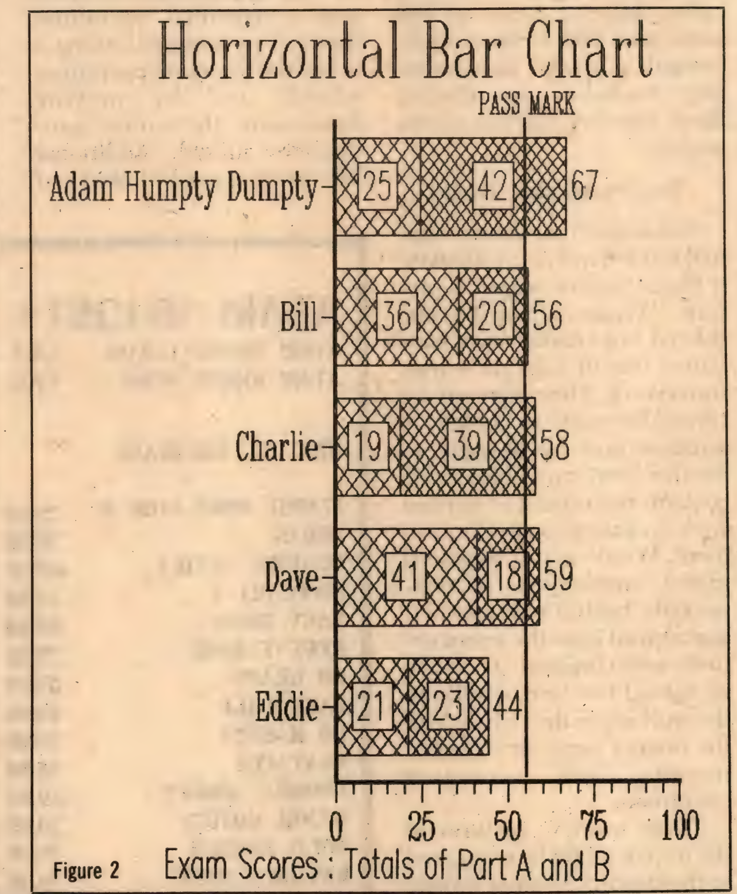

Figure 2 Exam Scores : Totals of Part A and B

While Logistix is good and does what it says it will do, it is no great advance in computer software. However, if you are building a program to be like Lotus 1-2-3, you can go only so far without creating something different. In what it has set out to do, Logistix seems to succeed. In trying to tack on Amiga-specific features—such as the chart windows—it doesn't quite make the grade.

Logistix is a product of Grafox of England and is available from Progressive Peripherals and Software at 464 Klamath Street in Denver, Colorado 80204 and at a suggested list price of $249.95. 512K is required. One disk drive is sufficient, two are recommended.

Superbase Personal

As a concept, Superbase is the complete opposite of Logistix: It is a relational database that makes full use of the Amiga operating environment and it will likely earn the same position of high esteem that accrued to Superbase 64 for the Commodore C64.

Being relational, Superbase allows the opening of several files simultaneously. More than that, these files can swap or share information and reports can be generated that pick different items of information from several files and combine them into one coherent document—depending, of course, on your skills in creating such a report.

As I have said often, creating a file for a database is easy; creating a report involves quite a bit more work and that is simply the nature of the beast. Nor should you expect to find cut-and-dried answers in the documentation for any such program: there are so many varied uses for databases that only one or two examples can be included and experience has shown that they never bear any resemblance to what I want to do. Expect to spend some time experimenting with reports.

To create a file with Superbase, only a little forethought is necessary. In a pop-up requester window, you specify the label for a field; the type of field (text, numeric or date) and the length of the field. Once this is done, the information on that field is placed into a larger section of the window, in sequence.

If you select a numeric field, a requester window allows you to select (by mouse-click) the

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Logistix & Superbase
continued from page 220

type of numbers you want: how many decimal places and how many spaces before the decimal. Should you wish a numeric field to hold the result of a calculation, click on Calculate and another pop-up window appears, in which you can click on the elements of your formula (field names and math operators.) In this, Superbase supports the four usual arithmetic operators as well as comparitive math operators.

For date fields, you have many options for customizing the display: mmddyy, ddmmyy, mmddyyyy and so on. In fact, you can even select the separators: "/" or "-."

When your file is ready the format is saved to disk and you're ready to enter information.

Once a file holds records, it may be manipulated by the row of "buttons" at the bottom of the workscreen. (Figure 3) If these look rather like the symbols on your VCR remote control, it is because they are the same. You may click on buttons for forward, reverse, stop, fast forward, fast reverse and pause. The fast speeds are quick and will run to the end of the file if you don't use Stop or Pause, but because the buffer holds only five or six records there will be short pauses for disk access during this operation.

For printing a report (or the entire record) to the screen, Superbase allows you to drag the fields into any position on the screen. Another display option, called Table Display, puts your records into a columnar format with the field names becoming column headers—automatically. (Figure 3)

Couple those two options with the ability to close specified fields (a closed field will not be displayed or printed) and you've probably covered ninety percent of the reports most of us would ever need to generate. However, Superbase also works for the top ten percent in allowing you to use filters and in providing the means for sophisticated queries.

Every file must have at least one filter and it may help to think of this as an index field. Other filters can be added as necessary, should you feel a need to have a file indexed on several criteria.

For queries, (sometimes called reports) you again operate from a pop-up window, clicking the mouse on field names and operators just as you did when creating formulas. Now, however, you are building a report and those operators are comparing data within specified fields in order to bring your information out in just the form you want.

Let's assume you need subtotals on three numerical fields (Huey, Dewey and Louie). Clicking the proper boxes in the requester window would build a command line like: REPORT SUM (the operators) Huey, Dewey, Louie.

If you wanted to break on subtotals in order to define how much of the total was allowance and how much earned from mowing Daisy's lawn, two more sequences would do it:

GROUP Donald SUM Huey, Dewey, Louie: GROUP Daisy SUM Huey, Dewey, Louie. (As before, uppercase indicates operators.)

Although it sounds simple in the telling, be prepared to hit the books and to spend some time experimenting. The difficulty of creating a report is in direct proportion to the level of sophistication you wish to achieve. Although the above example would be considered a semi-sophisticated report, it took only about half an hour to create and it must be admitted that some of that time was spent being tangled in syntax.

If you want to print the entire file on every girl you know, it's easy. But if you want it to combine three fields (blondes, brunettes and redheads), then sort out only those with blue or hazel eyes who live within a forty-mile radius of Tulsa and who don't mind going on a cheap date—you're going to have to work at it. But I think Superbase will make the work easier than anything else I've seen lately.

Superbase Personal does not stop with the filing of alphanumeric information. It can also create and sustain graphics files of pictures stored in the IFF format. It doesn't matter whether these are drawings made with Deluxe Paint or are digitized photographs or schematics done with Aegis Draw. They can be contained in a coherent file and the same VCR controls will work for taking you through that file (though they are then located on pulldown menus.)

A screendump feature allows the printing of any screen, whether picture or text, simply by pulling down the menu and clicking on that choice.

As delivered, Superbase Personal resides on it's own copyable disk—that may also be installed on a hard disk—and it, too, has that damned dongle. To run it, you must first boot Workbench. I found it easy, however, to delete everything but Preferences and CLI from a Workbench copy and to copy Superbase onto that disk—thus saving one step in the booting process.

Because it makes use of the Intuition interface, Superbase supports multitasking. This ability is undoubtedly one of the reasons why your data is not held in a larger buffer. Although the entire Superbase

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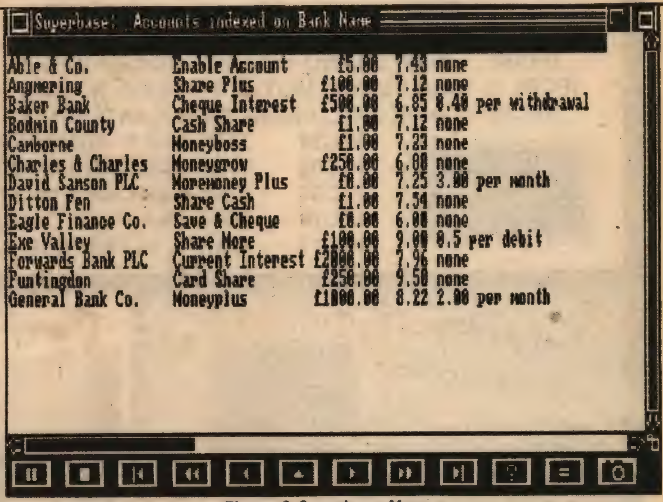

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Figure 3 Superbase Menu

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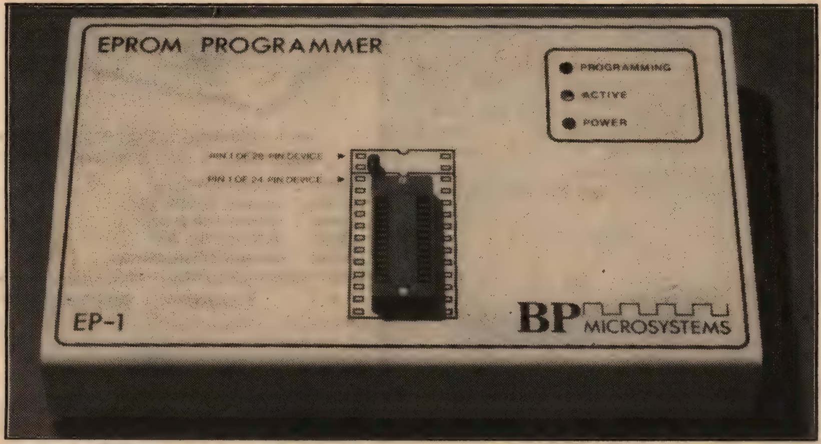

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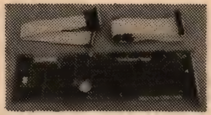

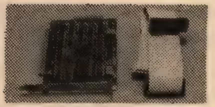

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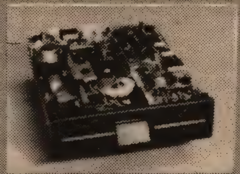

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360K **99.95**
FULL HEIGHT FLOPPY DRIVE
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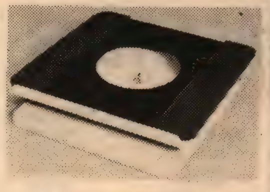
Computer Power Supplies

PS135	135 WATT POWER SUPPLY XT COMPATABLE	**$74.95**
PS150	150 WATT POWER SUPPLY XT COMPATABLE	**$89.95**
PS200	200 WATT POWER SUPPLY AT COMPATABLE	**$144.95**

Computer Monitor Swivel Stand



$12.95

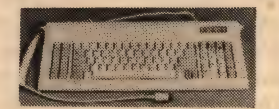
- Helps to eliminate eye and muscle strain caused by incorrect positioning of screen.
- Tiltable 12.5° up and down.
- Can revolve 360°

5¼ DSDD
GENERIC DISKETTES

Packaged in boxes of 10 w/sleeves. Labels and write-protect tabs
LIFETIME GUARANTEE

10 for $7.95
100 for $59.50

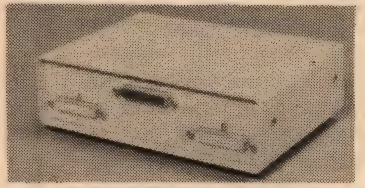
Computer Keyboards



KB5150	5150 KEYBOARD	**59.95**
KB5160	5160 KEYBOARD XT	**79.95**
KB5151	5151 KEYBOARD XT/AT	**89.95**

Altex DATA TRANSFER SWITCHES

ROTARY SWITCHES — 25 AND 36 LINE



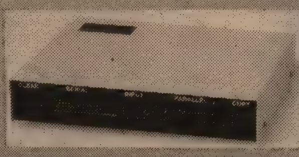
Features: **STRONG METAL CASE • RFI/EMI PROTECTION • NO POWER REQUIRED • GOLD PLATED CONTACTS • COMPACT, BUILT TO LAST**

AB252	25 LINE TWO WAY	64.95	AB362	36 LINE TWO WAY	89.95
AB253	25 LINE THREE WAY	79.95	AB363	36 LINE THREE WAY	106.95
AB254	25 LINE FOUR WAY	94.95	AB364	36 LINE FOUR WAY	119.95
AB255	25 LINE FIVE WAY	114.95	AB365	36 LINE FIVE WAY	144.95
AB25X	25 LINE CROSSOVER	86.95	AB36X	36 LINE CROSSOVER	116.95

Printer Buffers

PB64	64K PARALLEL PRINTER BUFFER	129.95
PB64SB	AS ABOVE WITH SWITCHBOX	169.95
PB256	256K PARALLEL PRINTER BUFFER	189.95
PB256SB	AS ABOVE WITH SWITCHBOX	219.95

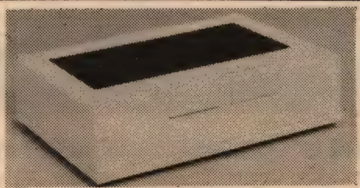
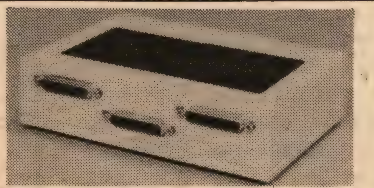
Centronics female connections



64K UNIVERSAL PRINTER BUFFER INTERFACE
UPB64 199.95
256K UNIVERSAL PRINTER BUFFER INTERFACE
UPB256 239.95

CONVERTS: Serial to Serial Parallel to Serial
Parallel to Parallel Serial to Parallel

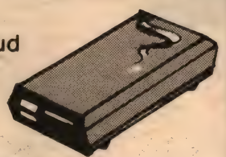
Economy PUSHBUTTON SWITCHBOXES

Features: **DURABLE PLASTIC CASE FOR USE IN LOW RFI/EMI AREAS • NO POWER REQUIRED • PUSH BUTTON OPERATION • LIGHT WEIGHT**

AB25PB	DB-25 TWO WAY LINE	39.95	AB36PB	CENTRONICS TWO WAY 36 LINE	44.95

Super Modems



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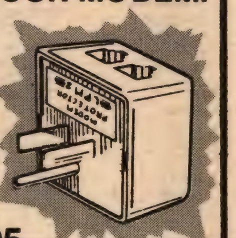
PROTECT YOUR MODEM!

MODEM SPIKE & SURGE PROTECTOR



Help you and your modem to avoid annoying headaches caused by power surges.

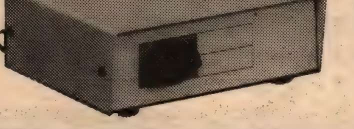
only **$19.95**

Solve your interconnection problems with our problem solvers DB-25 (RS-232).

GENDER CHANGER (AGC-M, AGC-F)	$7.95
GENDER CHANGER (AGC-36M, AGC-36F)	$16.95
NULL MODEM ADAPTER	$9.95
MINI PATCH BOX	$9.95
MINI TESTER	$19.95
SURGE PROTECTOR	$14.95

Economy ROTARY SWITCHBOXES

Features: **DURABLE METAL CASE • RFI/EMI PROTECTION • NO POWER REQUIRED • SILVER PLATED CONTACTS • COMPACT**



AB252E	DB-25 25 LINE TWO WAY	39.95
AB254E	DB-25 25 LINE FOUR WAY	49.95
AB25XE	DB-25 25 LINE CROSSOVER	49.95
AB362E	CENTRONICS 36 LINE TWO WAY	49.95
AB364E	CENTRONICS 36 LINE FOUR WAY	59.95
AB36XE	CENTRONICS 36 LINE CROSSOVER	59.95

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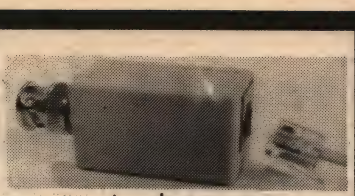
RG62 COAXIAL TO TWISTED-PAIR ADAPTER

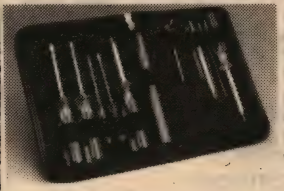
Economical Solution to coaxial cable cost!
Why use expensive cable for computer connections/networks when you can use this balun?



only **$15.95**

Altex Electronics Inc.

The Personal Computer Tool Kit



All the tools needed for working on and in the computer and peripherals neatly secured in a handsome black vinyl case.

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Connects: **SERIAL TO PARALLEL** or **PARALLEL TO SERIAL**

only **$99.95**

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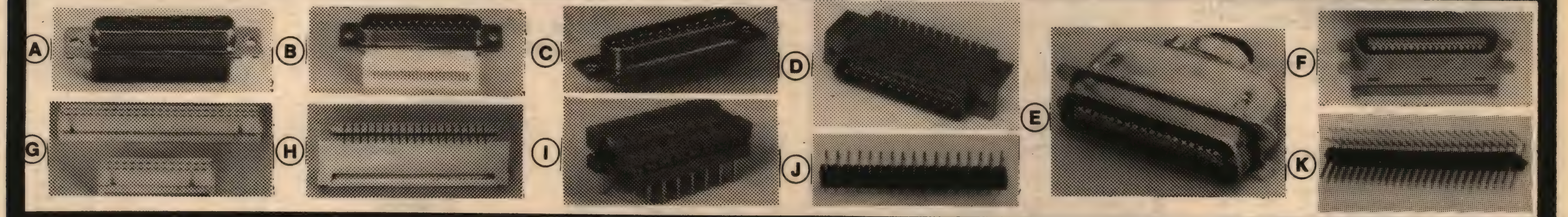
D-Series and Ribbon Cable Connectors



Ⓐ SOLDER POT

PART #	PRICE/QTY 1-49	50-99	100-499
9P	0.75	0.56	0.45
9S	0.80	0.60	0.48
15P	1.03	0.78	0.62
15S	1.10	0.83	0.66
19P	1.62	1.22	0.97
19S	1.62	1.21	0.97
25P	1.10	0.83	0.66
25S	1.20	0.97	0.78
37P	2.14	1.61	1.28
37S	2.41	1.81	1.45
50P	2.62	2.38	2.18
50S	3.70	3.36	3.08

Ⓑ RIBBON CABLE TYPE

PART #	PRICE/QTY 1-49	50-99	100-499
IDC9P	2.35	2.17	2.01
IDC9S	2.53	2.34	2.17
IDC15P	3.10	2.86	2.66
IDC15S	3.25	3.00	2.79
IDC25P	3.73	3.09	2.62
IDC25S	3.73	3.09	2.62
IDC37P	4.75	4.38	4.07
IDC37S	5.63	5.20	4.83
IDC50P	12.98	11.98	11.13
IDC50S	14.47	13.35	12.40

Ⓒ PC MOUNT STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-499
P9P	0.90	0.82	0.75
P9S	1.38	1.25	1.15
P15P	1.12	1.02	0.93
P15S	1.98	1.80	1.65
P25P	1.56	1.42	1.30
P25S	3.06	2.78	2.55
P37P	2.14	1.95	1.78
P37S	4.36	3.96	3.63
P50P	2.74	2.49	2.28
P50S	5.68	5.16	4.73

Ⓓ PC MOUNT RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-499
R9P	1.60	1.45	1.33
R9S	1.62	1.47	1.35
R15P	1.52	1.38	1.27
R15S	1.54	1.40	1.28
R25P	1.96	1.78	1.63
R25S	1.98	1.80	1.65
R37P	2.94	2.67	2.45
R37S	2.98	2.71	2.48

Ⓔ 57 SERIES SOLDER TYPE

PART #	PRICE/QTY 1-49	50-99	100-499
57-24P	3.68	3.35	3.07
57-24S	3.60	3.27	3.00
57-36P	3.00	2.67	2.40
57-36S	3.66	3.33	3.05
57-50P	5.12	4.65	4.27
57-50S	5.92	5.38	4.93

Ⓕ 57 SERIES RIBBON CABLE TYPE

PART #	PRICE/QTY 1-49	50-99	100-499
ID57-24P	5.00	4.62	4.29
ID57-24S	5.50	5.08	4.71
ID57-36P	4.25	3.78	3.40
ID57-36S	5.50	5.00	4.58
ID57-50P	8.03	7.42	6.89
ID57-50S	7.52	6.94	6.44

Ⓖ IDS SOCKET CONNECTOR

PART #	PRICE/QTY 1-49	50-99	100-499
IDS10	0.65	0.56	0.49
IDS14	0.74	0.64	0.56
IDS16	0.88	0.75	0.66
IDS20	0.93	0.79	0.70
IDS26	1.21	1.03	0.91
IDS34	1.58	1.35	1.18
IDS40	1.95	1.67	1.46
IDS50	2.32	1.99	1.74
IDS60	2.78	2.39	2.09

Ⓗ IDE EDGECARD CONNECTOR

PART #	PRICE/QTY 1-49	50-99	100-499
IDE10	1.30	1.16	1.04
IDE14	1.55	1.38	1.24
IDE20	1.48	1.27	1.11
IDE26	1.67	1.43	1.25
IDE34	2.04	1.75	1.53
IDE40	2.60	2.23	1.95
IDE50	2.97	2.54	2.23

Ⓘ IDD DIP PLUG CONNECTOR

PART #	PRICE/QTY 1-49	50-99	100-499
IDD14	0.85	0.77	0.71
IDD16	0.95	0.86	0.79
IDD24	1.65	1.50	1.38
IDD40	2.75	2.50	2.29

Ⓙ BREAKAWAY HEADER STRIPS STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-499
IDH10B	0.28	0.25	0.23
IDH14B	0.39	0.35	0.32
IDH16B	0.44	0.40	0.37
IDH20B	0.55	0.50	0.46
IDH26B	0.72	0.65	0.60
IDH34B	0.94	0.85	0.78
IDH40B	1.10	1.00	0.92
IDH50B	1.38	1.25	1.15

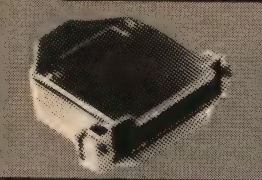
Ⓚ BREAKAWAY HEADER STRIPS RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-499
IDH10BR	0.36	0.33	0.30
IDH14BR	0.51	0.46	0.42
IDH16BR	0.58	0.53	0.48
IDH20BR	0.73	0.66	0.60
IDH26BR	0.94	0.86	0.79
IDH34BR	1.23	1.12	1.03
IDH40BR	1.45	1.32	1.21
IDH50BR	1.81	1.65	1.51

EMPTY CRIMP SHELLS

PART #	PRICE/QTY 1-49	50-99	100-499
C9P	0.70	0.46	0.32
C9S	0.70	0.48	0.34
C15P	0.73	0.52	0.36
C15S	0.73	0.53	0.37
C25P	0.75	0.54	0.38
C25S	0.75	0.57	0.40
C37P	0.96	0.87	0.80
C37S	1.00	0.91	0.83
C50P	1.12	1.02	0.93
C50S	1.14	1.04	0.95

HOODS-COVERS



GREY HOODS

PART #	PRICE/QTY 1-49	50-99	100-499
GH9	0.68	0.47	0.42
GH15	0.80	0.56	0.50
GH25	0.85	0.64	0.58
GH37	1.06	0.96	0.88
GH50	1.10	1.00	0.92

SHIELDED HOODS

PART #	PRICE/QTY 1-49	50-99	100-499
SH9	0.75	0.64	0.56
SH15	0.76	0.65	0.57
SH25	0.81	0.69	0.61
SH37	1.72	1.56	1.43
SH50	2.37	1.90	1.58

METAL HOODS

PART #	PRICE/QTY 1-49	50-99	100-499
MH9	1.75	1.56	1.40
MH15	2.00	1.78	1.60
MH25	2.13	1.89	1.70

AMP HOOD

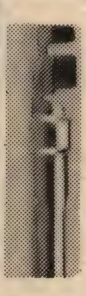
PART #	PRICE/QTY 1-49	50-99	100-499
AH25	1.25	1.00	0.83

DUAL HOODS

PART #	PRICE/QTY 1-49	50-99	100-499
DH25	1.13	0.90	0.75
DH37	1.17	0.94	0.78

SIDE OR REAR ENTRY HOOD

PART #	PRICE/QTY 1-49	50-99	100-499
SRH-9	1.00	0.80	0.67
SRH-25	1.13	0.90	0.75



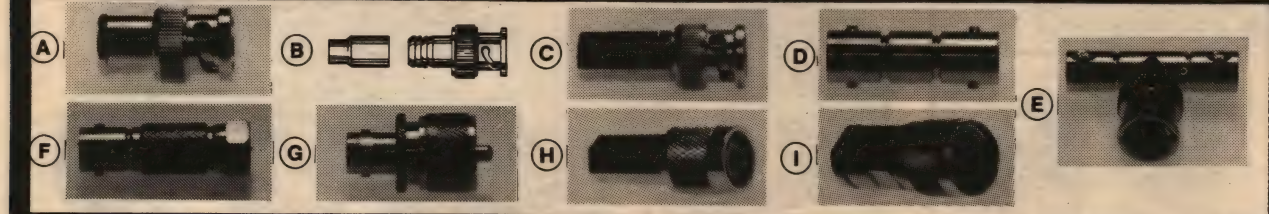
CRIMP CONTACTS

PART #	PRICE/QTY 1-99	100-999	1K-4999
CP20P	0.080	0.043	0.038
CP20S	0.100	0.054	0.048

MACHINED CONTACTS

PART #	PRICE/QTY 1-99	100-999	1K-4999
MCP20P	0.18	0.140	0.110
MCP20S	0.20	0.160	0.125

Coaxial Cable Connectors and Adapters



Ⓐ BNC CONNECTORS SOLDER TYPE

PART #	DESCRIPTION	PRICES 1-49	50-99	100-499
BNC58S	BNC solder for RG-58	1.95	1.18	0.98
BNC59S	BNC solder for RG-59	1.95	1.18	0.98

Ⓑ CRIMP TYPE

PART #	DESCRIPTION	PRICES 1-49	50-99	100-499
BNC58C	BNC crimp on for RG-58	1.95	1.50	1.25
BNCF58C	Female crimp for RG-58	1.95	1.40	1.17
BNC59C	BNC crimp on for RG-59	1.95	1.30	1.08
BNCF59C	Female crimp for RG-59	1.95	1.50	1.25
BNC174C	BNC male crimp for RG174	1.95	1.50	1.25

Ⓒ BNC TWIST-ON

PART #	DESCRIPTION	PRICES 1-49	50-99	100-499
BNC-T059	BNC twist on for RG-59 & 62	1.63	1.30	1.08
BNC-T058	BNC twist on for RG-58	2.08	1.92	1.79

Ⓓ Ⓔ BNC ADAPTER'S

PART #	DESCRIPTION	PRICES 1-24	25-49	50-UP
BNC-T	BNC "T" adapter	2.75	2.18	1.82
BNC-FS	BNC female inline splice	1.65	1.30	1.08
BNC-MS	BNC male inline splice	1.95	1.64	1.37
BNC-CMFT	BNC chassis mount feed thru	3.25	2.60	2.17
BNC-BR	BNC bulkhead receptacle	1.50	1.14	0.95
BNC-RA	BNC right angle adapter	2.75	2.08	1.73
BNC-58T	50 ohm terminator	2.95	2.69	2.50
BNC-59T	75 ohm terminator	2.95	2.69	2.50

Ⓕ Ⓖ COAXIAL CONNECTOR ADAPTERS

PART #	DESCRIPTION	PRICES 1-24	25-49	50-UP
F-BNC	F female to BNC male	1.95	1.50	1.20
BNC-F	BNC female to F male	1.75	1.38	1.10
RCA-BNC	RCA female to BNC male	1.75	1.23	0.98
BNC-RCA	BNC female to RCA male	1.75	1.23	0.98
F-RCA	F female to RCA male	1.75	1.23	0.98
RCA-F	RCA female to F male	1.75	1.25	1.00
RCA-UHF	RCA female to UHF male	1.75	1.25	1.00
BNC-UHF	BNC female to UHF male	2.50	1.90	1.52
UHF-BNC	UHF female to BNC male	2.50	1.88	1.50
F-UHF	F female to UHF male	1.95	1.50	1.20
UHF-F	UHF female to F male	1.75	1.33	1.06

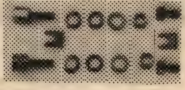
Ⓗ TNC CONNECTORS

PART #	DESCRIPTION	PRICES 1-24	25-49	50-UP
TNC-59C	TNC male crimp for RG-59	2.50	2.00	1.82
TNC-58C	TNC male crimp for RG-58	2.95	2.40	2.18
TNC-T059	TNC twist on for RG-59, 62	3.95	3.20	2.91
TNC-T058	TNC twist on for RG-58	3.95	3.20	2.91
TNC-IS	TNC inline splice	4.25	3.50	3.18
TNC-RA	TNC right angle	7.50	6.00	5.45

Ⓘ TWIN-AX CONNECTORS

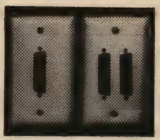
PART #	DESCRIPTION	PRICES 1-24	25-49	50-UP
TWX-MC	Male twinax connector	6.00	5.54	5.14
TWX-FIA	Female inline adapter	6.00	5.54	5.14
TWX-CM	Female bulkhead receptical	10.00	9.23	8.57
TWX-T	Twinax "T" adaptor	11.95	9.23	8.57

D-SERIES HARDWARE

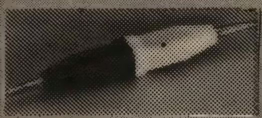


PART #	PRICE/QTY 1-49	50-99	100-499
MDH-1	0.55	0.36	0.30
FDH-2	0.75	0.56	0.46

RS-232 WALL PLATES



PART #	PRICE/QTY 1-9	10-24	25-49
WP9-1, WP15-1, WP25-1	1.88	1.36	1.25
WP9-2, WP15-2, WP25-2	2.13	1.55	1.42



Extractor Tool
Removes crimp contacts (Inserts also.)
EXT-1 **$2.75**

Crimping Tool
Professional ratchet type
CT-1645
$79.95

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MODULAR CONNECTIONS

TELEPHONE MODULAR CABLE ASSEMBLIES (plug to plug)

PART #	DESCRIPTION	PRICES
MC-4	4 pin cable	1.00 + .09 ft.
MC-6	6 pin cable	1.00 + .12 ft.
MC-8	8 pin cable	1.25 + .15 ft.

MODULAR PLUGS

PART #	DESCRIPTION	EA	100 EA
MP-4M	4 pin mini handset modular	0.25	14.95
MP-4	4 pin modular plug 4 x 6	0.25	14.95
MP-6	6 pin modular plug 6 x 6	0.25	15.95
MP-8	8 pin modular plug 8 x 8	0.35	26.95

MODULAR WIRE

PART #	DESCRIPTION	100 EA
MW4-100	100 ft. 4 conductor	6.95
MW4-500	500 ft. 4 conductor	29.95
MW4-1000	1000 ft. 4 conductor	49.95
MW6-100	100 ft. 6 conductor	8.95
MW6-500	500 ft. 6 conductor	39.95
MW6-1000	1000 ft. 6 conductor	64.95
MW8-100	100 ft. 8 conductor	12.95
MW8-500	500 ft. 8 conductor	54.95
MW8-1000	1000 ft. 8 conductor	99.95

MODULAR TO RS-232 ADAPTER KITS

Turns any 25 pin serial port to a modular jack, in either 4, 6, or 8 pin position. Use these with the modular cable assemblies to make your own custom cables.

- MA-4M—RS-232 MALE TO 4 PIN MODULAR 4.50
- MA-6M—RS-232 MALE TO 6 PIN MODULAR 4.50
- MA-6F—RS-232 FEMALE TO 6 PIN MODULAR 4.50
- MA-8M—RS-232 MALE TO 8 PIN MODULAR 4.95
- MA-8F—RS-232 FEMALE TO 8 PIN MODULAR 4.95
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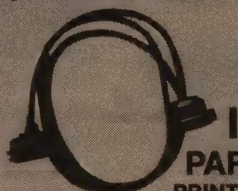

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PPC301-10	10 ft.	12.00
PPC301-15	15 ft.	19.95
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VMC-10	10 ft. video cable RCA to RCA	2.50
DDC-22	dual floppy controller cable	6.95
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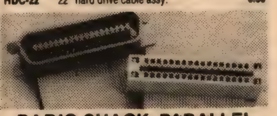
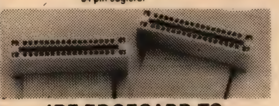


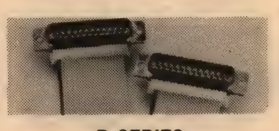
RADIO SHACK PARALLEL PRINTER CABLE

PART #	DESCRIPTION	PRICE
36P-34E	36 pin male 34 pin edg.crd.	8.50 + .68 per ft.



IDE EDGECARD TO IDE EDGCARD

PART #	DESCRIPTION	PRICE
10E-10E	10 pin edg.crd. to edg.crd.	3.80 + .20 per ft.
14E-14E	14 pin edg.crd. to edg.crd.	4.00 + .28 per ft.
20E-20E	20 pin edg.crd. to edg.crd.	4.50 + .40 per ft.
26E-26E	26 pin edg.crd. to edg.crd.	5.30 + .52 per ft.
34E-34E	34 pin edg.crd. to edg.crd.	5.90 + .68 per ft.
40E-40E	40 pin edg.crd. to edg.crd.	7.00 + .80 per ft.
50E-50E	50 pin edg.crd. to edg.crd.	8.50 + 1.00 per ft.



D-SERIES

PART #	DESCRIPTION	PRICE
9P-9P	9 pin male to male	5.64 + .18 per ft.
9P-9S	9 pin male to female	5.86 + .18 per ft.
9S-9S	9 pin female to female	6.08 + .18 per ft.
15P-15P	15 pin male to male	7.44 + .30 per ft.
15P-15S	15 pin male to female	7.62 + .30 per ft.
15S-15S	15 pin female to female	7.80 + .30 per ft.
25P-25P	25 pin male to male	8.96 + .50 per ft.
25P-25S	25 pin male to female	9.62 + .50 per ft.
25S-25S	25 pin female to female	10.28 + .50 per ft.
37P-37P	37 pin male to male	11.40 + .74 per ft.
37P-37S	37 pin male to female	12.46 + .74 per ft.
37S-37S	37 pin female to female	13.52 + .74 per ft.
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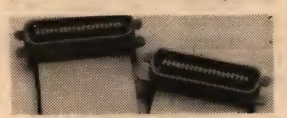
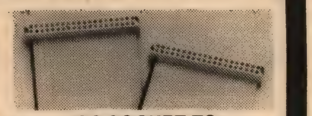
50S-50S	50 pin female to female	28.94 + 1.00 per ft.



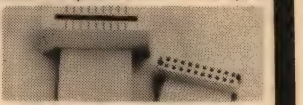
57 SERIES RIBBON CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE
5724P-P	24 pin male to male	10.00 + .48 per ft.
5724P-S	24 pin male to female	10.50 + .48 per ft.
5724S-S	24 pin female to female	11.00 + .48 per ft.
5736P-P	36 pin male to male	8.00 + .72 per ft.
5736P-S	36 pin male to female	10.00 + .72 per ft.
5736S-S	36 pin female to female	12.00 + .72 per ft.
5750P-P	50 pin male to male	16.75 + 1.00 per ft.
5750P-S	50 pin male to female	16.25 + 1.00 per ft.
5750S-S	50 pin female to female	15.75 + 1.00 per ft.



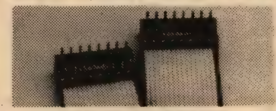
IDS SOCKET TO IDS SOCKET

PART #	DESCRIPTION	PRICE
10S-10S	10 pin socket to socket	2.00 + .20 per ft.
14S-14S	14 pin socket to socket	2.50 + .28 per ft.
16S-16S	16 pin socket to socket	2.75 + .32 per ft.
20S-20S	20 pin socket to socket	2.85 + .40 per ft.
26S-26S	26 pin socket to socket	3.50 + .52 per ft.
34S-34S	34 pin socket to socket	4.10 + .68 per ft.
40S-40S	40 pin socket to socket	4.50 + .80 per ft.
50S-50S	50 pin socket to socket	6.15 + 1.00 per ft.
60S-60S	60 pin socket to socket	6.65 + 1.20 per ft.



IDS SOCKET TO IDE EDGCARD

PART #	DESCRIPTION	PRICE
10S-10E	10 pin socket to edg.crd.	3.20 + .20 per ft.
14S-14E	14 pin socket to edg.crd.	3.50 + .28 per ft.
20S-20E	20 pin socket to edg.crd.	3.75 + .40 per ft.
26S-26E	26 pin socket to edg.crd.	4.75 + .52 per ft.
34S-34E	34 pin socket to edg.crd.	5.40 + .68 per ft.
40S-40E	40 pin socket to edg.crd.	6.45 + .80 per ft.
50S-50E	50 pin socket to edg.crd.	7.85 + 1.00 per ft.



IDD DIP PLUG TO IDD DIP PLUG

PART #	DESCRIPTION	PRICE
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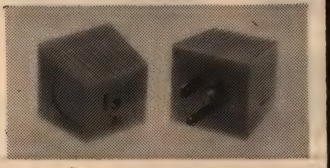

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The Amiga

continued from page 219

or required activity to be considered and then executed.

The Textural Tools

The tonal textures of music and voice can be readily reproduced with an Amiga. The sonorous timbres of various musical instruments can be duplicated. Pitch, tone, volume, tempo, and duration are all programmable and playable through the internal speaker system or through a standard stereo system. Music can be written, arranged, played, and notated; and human voice qualities can be faithfully reproduced. The spoken word can be used to replace the written copy as an active living expression of ideas. The computer is thus emulating the right brain functions that regulate the production of speech and singing sounds.

And there is also multitasking. Various levels of tasks can all be operating at the same time and referred to by setting them in front or behind one another through windowing. Their relative importance can be indicated by their relationship to the front task currently in operation. This multitasking operating system permits the user to continue with many different tasks at the same time, all of them capable of being monitored and directed by quick references to their current status through viewing on the foreground window screen. This is like the right side of the brain which keeps different objects in a holding pattern and jumps from one perception to another as in a stream of consciousness imagery.

Interface Operations

Even the method of computer interface is different. A mouse, light pen, joystick, or musical keyboard can be used to direct the computer. These control the operations different than using the standard keyboard, as in the left focused computers which concentrate on words and numbers. To activate or manipulate spatial relationships, one merely directs a pointer towards the object called an icon using the light pen or mouse tool and with a quick click selects it. Through clicking buttons and moving the tool objects can be selected, dragged, arranged, sized, reviewed, or discarded. Another tool often used is the joystick which manipulates images on the screen in spatial and time sequences for rapid real-time execution and immediate user feedback. A musical keyboard can plug into the computer to play notes while processing them into tones for continued listening or through MIDI to interface with other instruments.

Yet while the Amiga uses custom dedicated chips, special software screen images, and directional and interface tools for its software screen images, and directional interface tools for its right brain operations, it also contains those generic chips and a full alphanumeric keyboard that allows it to function like the left sided traditional computers. The 68000 chip could be considered as the left brain side of the Amiga's architecture. Here the traditional functioning of the personal computer can take place with word processing, accounting, spreadsheets, databases, and statistics. Consider it like having two computers in one, or the two halves of left and right brain brought together into one unit.

Coordinated Hemispheres

And just like the human brain where there is a coordination between the two

continued on page 227

Logistix & Superbase

continued from page 221

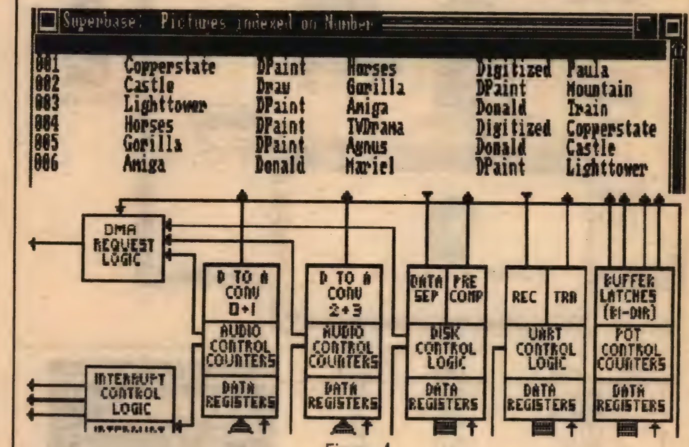
program is in RAM, it leaves you with about 200K free—large enough for a respectable file as well as another program.

Uses for a relational database are as varied as the people who buy them, but one thing has stood out in my mind since first seeing Superbase:

For several years, real estate companies have been trying to automate listing catalogs. They've tried videotape and they tried the abortive Polaroid movies and God knows what else. With its ability to store digitized IFF images and its abilities as a relational database capable of having several files open and interacting at once, Superbase Personal may be just what they've been striving for. (Figure 4 is a composite. Two screens cannot be dumped at once, but this illustrates a screen display of graphic files and one of the graphics from that file.)

And if it is what the real estate business is looking for, that's another million-dollar idea I've given away.

Superbase Personal is a product of Precision Software and is available from Progressive Peripherals and Software at 464 Klamath Street, Denver, Colorado and at a suggested list price of $149.95. 512K is required. ●



Superbase: Pictures indexed on Number

001	Copperstate	DPaint	Horses	Digitized	Paula
002	Castle	Draw	Gorilla	DPaint	Mountain
003	Lighttower	DPaint	Amiga	Donald	Train
004	Horses	DPaint	TVDrama	Digitized	Copperstate
005	Gorilla	DPaint	Agnus	Donald	Castle
006	Amiga	Donald	Mariel	DPaint	Lighttower

Figure 4

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Organize—Database

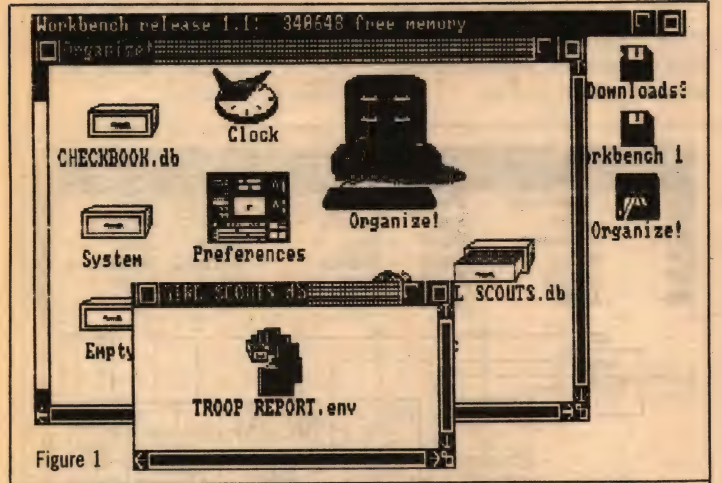
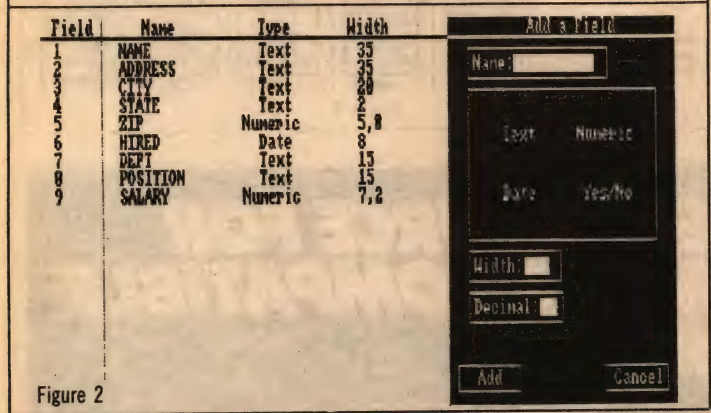


Figure 1



Field	Name	Type	Width
1	NAME	Text	35
2	ADDRESS	Text	35
3	CITY	Text	20
4	STATE	Text	2
5	ZIP	Numeric	5,0
6	HIRED	Date	8
7	DEPT	Text	15
8	POSITION	Text	15
9	SALARY	Numeric	7,2

Figure 2

Reviewed by Ervin Bobo

Sometimes I feel that something other than blind chance controls the availability of computer software: Some presence, not necessarily divine, who says, "No. Let's not do Amiga databases yet. Wait until everyone gives up hope, then we'll flood the market and confuse everybody."

And all this is by way of saying that the past two months have seen databases for the Amiga move out of the vaporware category and onto dealer's shelves. Granted, an early entry was InfoBase from HarvSoft (newly offered at a list of $25.00). And there was MiAmiga File (previously reviewed in *Computer Shopper*). Both, however, were not much more than keepers of mailing lists.

More recently, we've seen Omega File (reviewed last issue) and Superbase Personal (this issue) and now we finally have Organize from Micro-Systems Software, the long awaited companion to Scribble and Analyze.

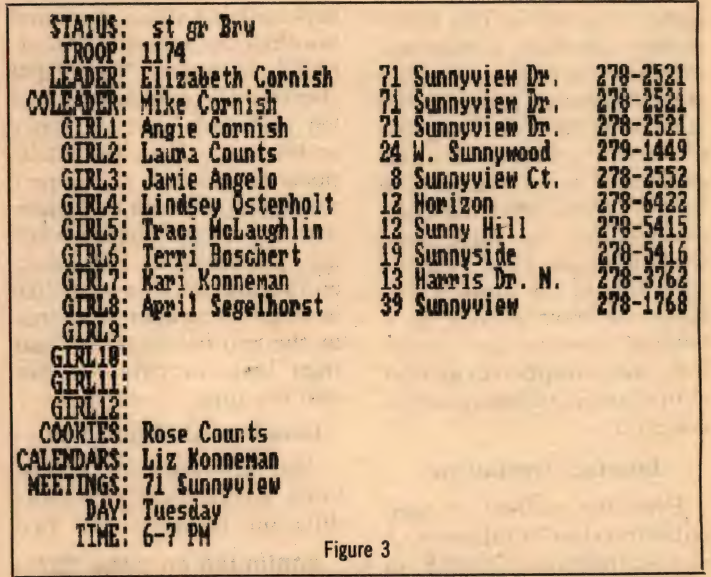
Although it is not a relational database—and lacks one or two features I would like to have—Organize does manage to deliver both power and utility as well as ease of use: One routine I follow with each new piece of software is to see how far I can get without reading the documentation. In the case of Organize, I managed to create a form and a file with no help other than what appears on the screen.

Making use of the mouse and pull-down menus, Organize operates as an Amiga program should. Though it requires 512K, there is enough memory left over—depending on the size of your records—to multitask with other programs such as Scribble. With no copy protection, it is easy to make a working copy or to install it on a hard disk. Further, it will create a drawer and icons for your files and reports, making it easy to get going on subsequent uses. (Figure 1. Note the large icons and the opened drawer for the Girl Scout file.)

This last, by the way, takes some of the confusion out of the multiple archives which have become standard in programs from Micro-Systems. For Organize, there is an archive for the file, an archive for the form and another for the report. Once created, however, you can simply click on the icon for the part of the program you wish to use and race on from there.

In creating a form, Organize replaces the default screen with one that is divided into two main sections: On the right, a requester window gives you a box into which you type your field name and other click-on boxes in which to categorize it as a text, numeric or date field and still another box into which you type your field length. Once a field is defined to your satisfaction, you click on the "Submit" box (submitting it for approval, I suppose) and the field name as well as field parameters takes it's place

continued on page 232



```
   STATUS:  st gr Brw
    TROOP: 1174
   LEADER: Elizabeth Cornish      71 Sunnyview Dr.   278-2521
 COLEADER: Mike Cornish           71 Sunnyview Dr.   278-2521
    GIRL1: Angie Cornish          71 Sunnyview Dr.   278-2521
    GIRL2: Laura Counts           24 W. Sunnywood    279-1449
    GIRL3: Jamie Angelo            8 Sunnyview Ct.   278-2552
    GIRL4: Lindsey Osterholt      12 Horizon         278-6422
    GIRL5: Traci McLaughlin       12 Sunny Hill      278-5415
    GIRL6: Terri Boschert         19 Sunnyside       278-5416
    GIRL7: Kari Konneman          13 Harris Dr. N.   278-3762
    GIRL8: April Segelhorst       39 Sunnyview       278-1768
    GIRL9:
   GIRL10:
   GIRL11:
   GIRL12:
  COOKIES: Rose Counts
CALENDARS: Liz Konneman
 MEETINGS: 71 Sunnyview
      DAY: Tuesday
     TIME: 6-7 PM
```

Figure 3

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The Amiga

continued from page 225

sides, so in the personal computers both activities can and do function together. As the brain is flexible and able to compensate for loss to either side by having the other side take up the functioning of the damaged area, so computers with their different types of operating chips and special programming can do both verbal and numeric tasks as well as spatial and time processing. With the Amiga one can use the windows, screens, and mouse tool or the traditional command line interface and keyboard either independently by themselves or interspersed together in the same operations. However, they are used, the functioning is similar to the human brain which passes messages between the hemispheres to perform its operations jointly as needed.

But what is of utmost importance here is the matter of speed, efficiency, usefulness, and accuracy in the style of processing. For just as most humans do much better using the skills of one side of the brain over the other so can computers excel in a similar way. The use of the special tools (mouse, light pen, joystick, windows, screens, menus) can do some operations much more effectively than a keyboard and command line or vice-versa. It depends on the task to be accomplished as to style used and the tools most applicable.

Separate Hemispheres

The operations of the two hemispheres of the brain approach reality in diverse manners. The logical left side seeks to determine factual knowledge about realities, the truth of the matter. The intuitive right side attempts to appreciate the beautiful interrelationships and unity of reality, the beauty of existence. And although these work together in the brain, their focus is different.

And likewise with computers that imitate these functions. The left-focused computers gather and summarize the facts to tell us significant information about reality. The right-focused computers recreate symbols of reality representing the fine interdependence between various systems in reality. The Amiga is most apt for expressing the latter because of its hardware design and accompanying software systems that foster and enhance the perception and display of interrelationships.

So this is what we observe in the Amiga: (1) some very powerful custom chips in hardware dedicated primarily to the development of the tasks associated with the right side of the human brain, (2) some remarkable software created visual interfaces that indicate the relational functioning and modification of the computer's operations and data, and (3) unique controlling tools that allow for rapid placement and interaction with the computer. With these attributes it is an ideal computer for pictorial imagery, graphic display, animation, sound sequencing and those skills known traditionally as the Arts, the realm of the right hemisphere.

For Whose Benefit?

The passing scientific age has given us many tools for the development of the logical, thinking, and reasoning powers of our race. But now comes a new age using new technologies by which the intuitive, artistic, and relational abilities can be enhanced through such personal computer tools as the Amiga. The rest of the human potential now has an opportunity to extend itself rapidly beyond its present borders. Even different abilities can be discovered that were previously unrealized. Now begins a time when the skills of art become more easily rendered with ever more expanding possibilities.

Thus it will be the artist much more than the scientist who will select an Amiga. The painter and graphic artist will stand in awe at the simplicity and speed of visual display on the Amiga. The musician will wonder at the sounds and textures he is able to execute so effectively on the Amiga. The educator will be able to create and display the knowledge of various disciplines with combined words, charts, sounds, and images quickly and effortlessly. The visual arts communicator will create instant images for production and distribution on videotape or broadcast TV.

And so look to the dream-doer rather than the data-manager to opt for the Amiga. One who dreams will display icon images as a reflection of perceived inner experiences. The game-player will shape imagined realities through the diversion of play activity. The trainer of skills will generate many more options through a simulated action of alternatives played forth on the Amiga. And the mystic who has been in touch with unseen realities and wishes somehow to recapture them will be drawn to mirror them on the Amiga. Individuals who have never felt the need to use the traditional computers will be drawn to explore new potentials with the availability of right-brain focused personal computers.

Human intuition now also has a tool to enhance its abilities as does logic. Feeling can now be expressed more fully through picture icons as historically thinking has been through words. Dreams and reveries can be sketched out on a screen of images. The rhythms of life can be scored and modeled for listening. Actions can be simulated for consideration before they are lived out. Dormant skills lying long underground in the human psyche can be released for consideration, development, and utilization by mankind. Yes, new vistas are opening to the human potential as it explores the possibilities latent on the other, the right side of the human hemisphere. ●

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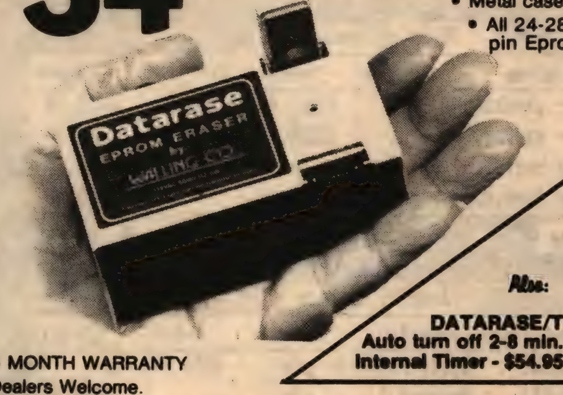

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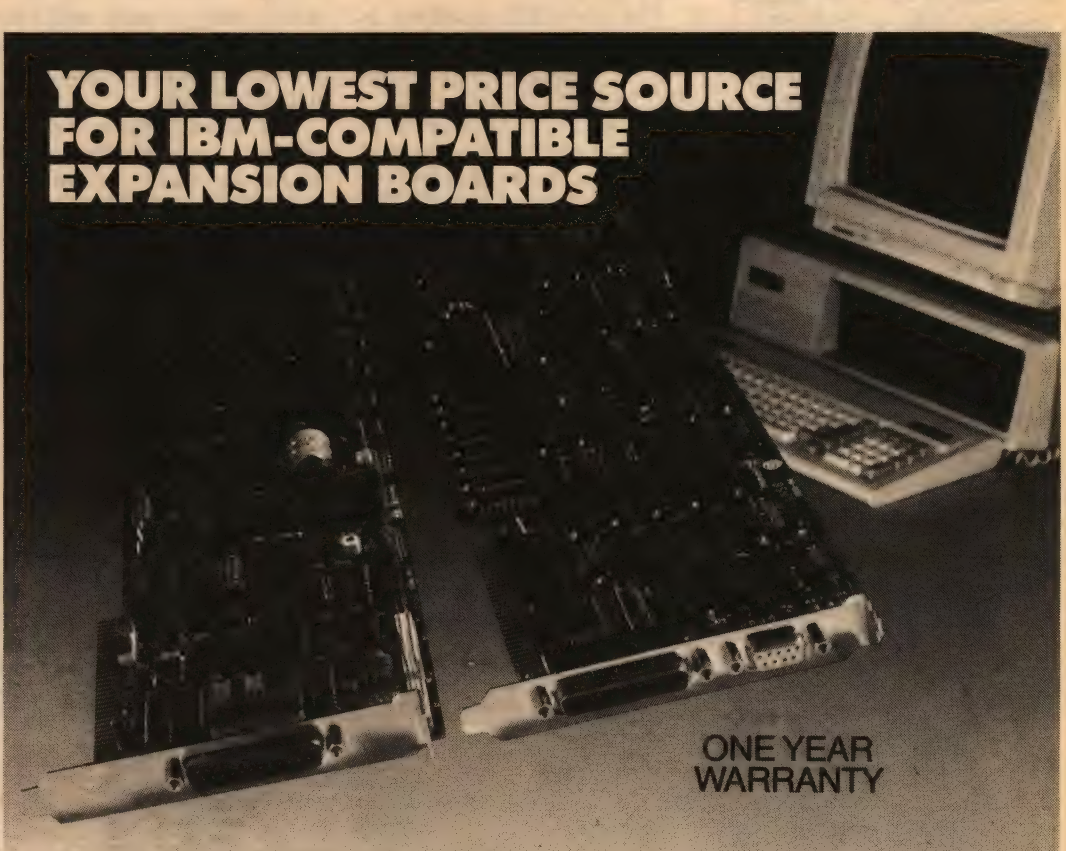

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MiAmiga Ledger

Reviewed by Ronald Bobo

Following closely on the heels of its successful filing program, MiAmiga File, the Softwood Company has released the second in its series of reasonably priced software for small business and personal use.

The new entry, MiAmiga Ledger, is billed as a full-featured General Ledger system for the Amiga computer.

The purpose of a general ledger system is to keep track of financial matters affecting the net worth of a company or individual. Income and expense are tracked as well as value of things owned, how much is owed to creditors and how much is debt free. Careful analysis of the output from a general ledger system should better enable one to make decisions relating to finances.

While one should not expect to use MiAmiga Ledger to track the financial affairs of a large corporation, it is more than adequate for personal use and many small businesses. Too, a General Ledger is not a complete accounting system. The publisher, however, has announced forthcoming programs to handle Accounts Receivable, Accounts Payable and Inventory. Once these are available, accounting with the MiAmiga system should become more attractive to larger businesses.

At least 512K of memory is required to run this system. While the system may be used on a one-drive Amiga, two would be better, particularly if the possibility exists that files will be large. Extra memory, if present, is utilized by MiAmiga Ledger although 512K should be sufficient for most needs.

MiAmiga Ledger is accompanied by a 75 page manual, spiral-bound to lay flat when in use. The program comes on a Workbench disk and is not copy protected.

The Intuition interface is used throughout, making full use of Amiga pulldown menus and mouse control.

While I found no bugs in the software itself, the manual does have some rough edges. At one point, in a tutorial, instructions are given to post data, along with the results of such postings, **before** the data is entered. (Instructions for entry appear on the following page.) Naturally, this could cause some confusion to a person working through the tutorial. Conversation with a staff member at Softwood revealed that the company did know of the transposition, and he assured me that it will be corrected in the next printing of the manual.

The manual is not, and does not claim to be, a textbook or course in accounting or bookkeeping. The tutorial section does, though, contain step-by-step instructions for using the system, from setting up and installing a Chart of Accounts through entering and posting transactions, printing out the reports and closing out an accounting period. Although bookkeeping and/or accounting may seem intimidating to many people, most will find this system easy to learn and use even without formal training in the field.

The default display is divided into two windows, one above the other. The top window displays individual accounts, with description, type, opening balance, adjustments made during this period and present balance. Since MiAmiga Ledger can hold account data for twelve previous periods, it is sometimes necessary to scroll horizontally as well as vertically within this window.

The bottom window is used for making journal entries, i.e. income and expense entries for a particular period. This period for a business might be daily, while an individual using MiAmiga Ledger for personal accounting might prefer to make entries only once each week or, alternatively, as expenses or income are incurred. MiAmiga Ledger is flexible enough to accommodate whichever method one chooses. When completed entries are posted to the ledger, data in this bottom window is transferred to the appropriate columns in the top window. During subsequent sessions, data already posted will be ignored and only new data transferred to the accounts window.

During this posting process, if debits and credits are not equal, an error message is displayed. It is then necessary to correct the error or errors and re-post.

Either window may be expanded to occupy the entire screen by clicking on gadgets located at the left and right bottom corners of the respective windows. This is a toggle; clicking once expands a window, clicking again shrinks it and makes the other window visible.

This arrangement is a convenience for the person doing the entries. Should one forget, for instance, that the account number for Office Supplies is 529 (or whatever number is assigned) there is no need to search frantically through a manual; simply scroll through the top window until the desired account is found.

Another convenient feature is present in the Journal entries window. When making entries, if data is duplicated, i.e. if the date to be entered is the same as the date on the previous entry, it is not necessary to re-type the data. Pressing the TAB key will cause whatever is on the line above to be duplicated on the current line before skipping to the next column.

In a business situation where many entries are made in a session, this feature could save considerable typing.

continued on page 234

```
Feb 1986                          MiAmiga Company
                                  Income Statement

                                                     Month-to-Date     Year-to-Date
Income

     Services revenue........................   $       3000.00 $        13000.00
     Interest income ........................               .00              500.00
                                                 --------------- ---------------
     Total  Income                              $       3000.00 $        13500.00
                                                 --------------- ---------------

Expenses

     Depreciation............................   $           .00 $          100.00
     Insurance ..............................            100.00              600.00
     Interest expense........................             50.00              450.00
     Office supplies ........................            200.00              550.00
     Rent....................................            500.00             2000.00
     Telephone ..............................             50.00              500.00
     Utilities ..............................             20.00              295.00
                                                 --------------- ---------------
     Total  Expenses                            $        920.00 $         4495.00
                                                 --------------- ---------------
     Net  Income <Loss>                         $       2080.00 $         9005.00
                                                 =============== ===============
```

```
Feb 1986                          MiAmiga Company
                                   Balance Sheet

Assets

     Cash - checking ..................................................$        16855.00
     Cash - savings  ..................................................          5500.00
     Office building ..................................................         50000.00
     Office furniture & equipment......................................          4000.00
     Accumulated depreciation - Office equipment ...................... <         100.00>
                                                                        ---------------
     Total Assets                                                       $        76255.00
                                                                        ===============


Liabilities

     Mortgage..........................................................$        40000.00
     Note payable......................................................          3750.00
                                                                        ---------------
     Total Liabilities                                                  $        43750.00
                                                                        ---------------
Equity

     Prior capital ....................................................$        25500.00
     Year to date income/loss..........................................          9005.00
     Owner drawing .................................................... <        2000.00>
                                                                        ---------------
     Total Equity                                                       $        32505.00
                                                                        ---------------
     Total Liabilities and Equity                                       $        76255.00
                                                                        ===============
```

```
Feb 1986                          MiAmiga Company
                                  Journal Entries

Tran        Date    Account   Comments          Source         Debit        Credit
----   ----------   -------   ---------------   ------   -----------   -----------
1         2/01/86   101       Daily receipt      c/r         3000.00           .00
1         2/01/86   401       Revenue            c/r             .00       3000.00
2         2/01/86   560       Check 3101         c/d          500.00           .00
2         2/01/86   564       Check #102         c/d           50.00           .00
2         2/01/86   566       Check #103         c/d           20.00           .00
2         2/01/86   523       Check #104         c/d          100.00           .00
2         2/01/86   529       Check #105         c/d          200.00           .00
2         2/01/86   101       Record paymen      c/d             .00        870.00
3         2/03/86   210       Check #106         c/d          250.00           .00
3         2/03/86   524       Check #106         c/d           50.00           .00
3         2/03/86   101       Record paymen      c/d             .00        300.00
4         2/03/86   302       Check #107         c/d         1000.00           .00
4         2/03/86   101       Record draw        c/d             .00       1000.00
5         2/04/86   140       Office buildi      gj         50000.00           .00
5         2/04/86   205       Mortgage           gj              .00      40000.00
5         2/04/86   102       Savings            gj              .00      10000.00
                                                         ===========   ===========
                                                            55170.00      55170.00
```

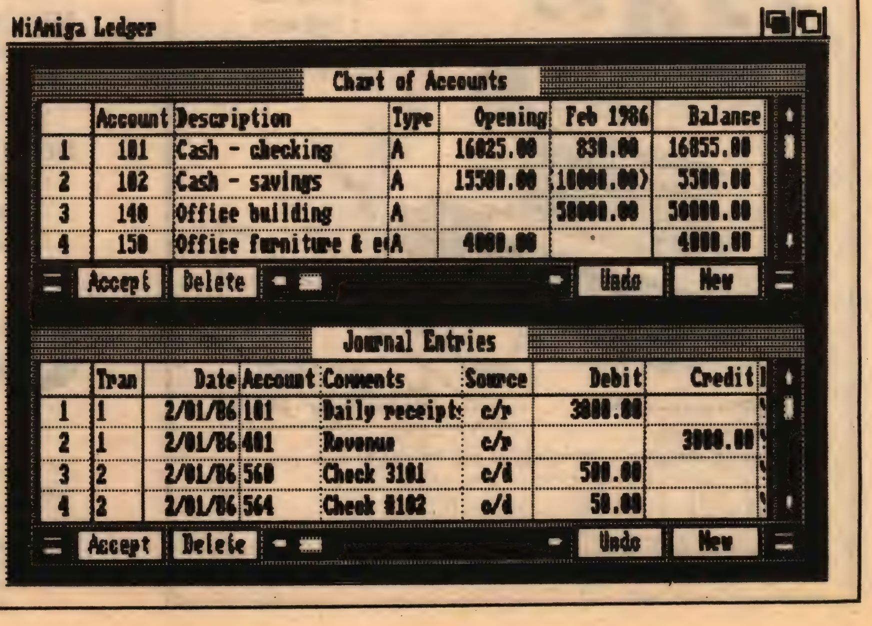

Chart of Accounts

	Account	Description	Type	Opening	Feb 1986	Balance
1	101	Cash - checking	A	16025.00	830.00	16855.00
2	102	Cash - savings	A	15500.00	(10000.00)	5500.00
3	140	Office building	A		50000.00	50000.00
4	150	Office furniture & e	A	4000.00		4000.00

Journal Entries

	Tran	Date	Account	Comments	Source	Debit	Credit
1	1	2/01/86	101	Daily receipt	c/r	3000.00	
2	1	2/01/86	401	Revenue	c/r		3000.00
3	2	2/01/86	560	Check 3101	c/d	500.00	
4	2	2/01/86	564	Check #102	c/d	50.00	

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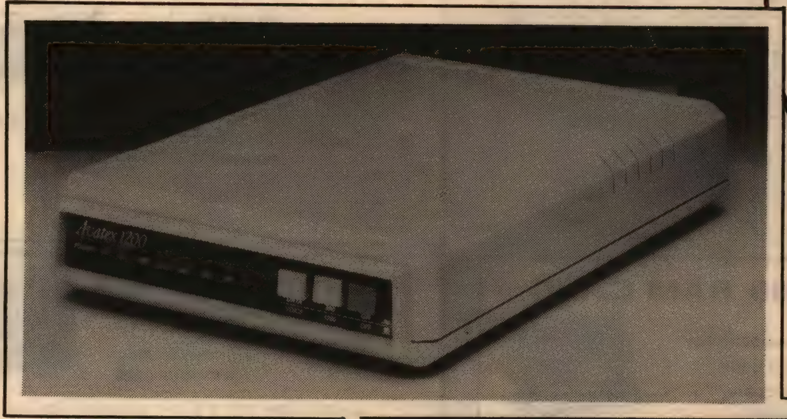
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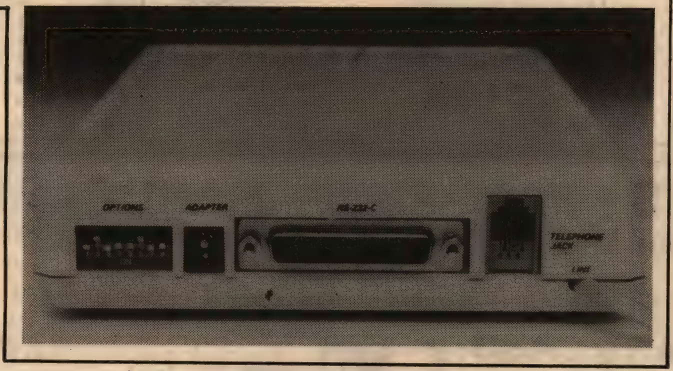
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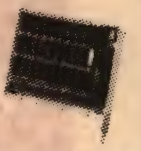

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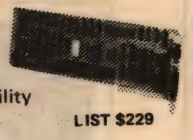

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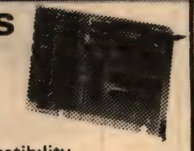

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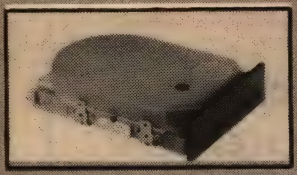

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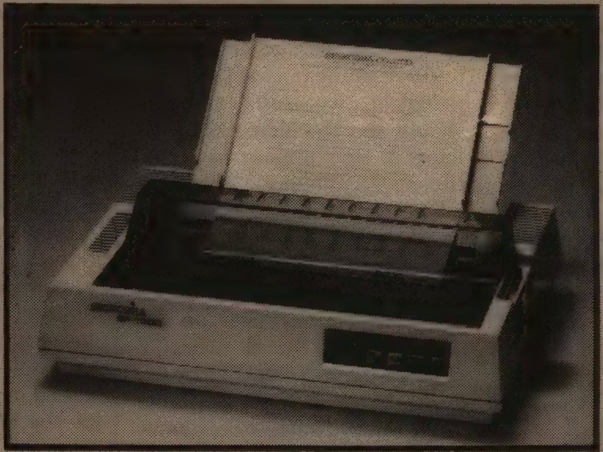

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789:;<=>?@ABCDEFGHI
/0123456789:;<=>?@ABCDEFGHI
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Standard Character	Standard	Pica	*12x9	80	10	100
		Elite	*12x9	96	12	50
		Condensed	*14x9	137	17	70
	Near Letter Quality	Pica	*24x18	80	10	20
		Elite	*12x18	96	12	24
Italic Cursive Character	Standard	Pica	*16x9	80	10	100
		Elite	*16x9	96	12	50
		Condensed	*18x9	137	17	70
	Near Letter Quality	Pica	*32x18	80	10	20
		Elite	*32x18	96	12	24
Graphic	Single Density Graphic		nx8	480 dot column	—	600 dot column
	Double Density Graphic		nx8	960 dot column	—	490 dot column
	Double Speed, Double Density Graphic		nx8	*960 dot column	—	600 dot column
	Quadruple Density Graphic		nx8	*1920 dot column	—	*980 dot column
	640 Dot Graphic		nx8	640 dot column	—	326 dot column
	576 Dot Graphic		nx8	576 dot column	—	294 dot dolumn
	720 Dot Graphic		nx8	720 dot column	—	367 dot column

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continued from page 226

on the left side of the screen, giving you a constant reminder of what you've done so far. (See Figure 2 on page 226).

The next field takes it's place below the first and this stacked format becomes the default record. Later, you'll enter your information in each field and, at the end, press open-Amiga-s to have the record accepted as a part of your file. (See Figure 3 on page 226).

Records do not go immediately to disk but are kept in a small buffer. The number of records in a buffer will depend upon the size of the individual record but a good rule of thumb is to expect no more than ten records in RAM at any given time. This gives Organize an acceptable operating speed while still cutting your losses in the event your system goes down.

In forming a report, you select the "Change" option from the Report menu. At this point, any numeric fields may be made to operate on one another with the result displayed in a derived field. A derived field is not saved as part of a record and so takes up no disk space—yet it is always there when you recall the file and, if desired, will appear in any reports. In math, Organize supports the four standard operators as well as the full list of logical comparators, then adds functions usually found only in spreadsheets such as cosine; tangent; if; true; false and about seventy more.

There is more to reporting, however, and Organize also makes this step easy. You may delete fields that are not necessary to your report (they are not lost but are simply closed temporarily for purposes of the report) and, with the mouse, drag the remaining fields all over the screen until you've found a form to suit your needs. It is this form that will be saved in the Project archive (as opposed to the database archive and the form archive).

As with other programs from Micro-Systems, archive requesters are presented in the form of pop-up windows that list all files saved in that particular archive and that give you requester buttons that allow you to save, get, change directory, delete, etc. We find this large window easy to read and easy to use. Because each archive has it's own requester window, it will list only the items in that directory. You won't have to look through the entire disk directory or have to remember filename extensions.

There are as many ways to report from a database as there are possible arrangements of the fields. For those times when you may not wish to view every record on file, Organize allows you to define filters that are expressed with math comparators: CITY = "New York" would filter out only records with that city in that field. CITY = "New York" OR "Boston" would. . . you guessed it.

Reporting may be done to screen, printer or disk. In the case of screen and printer, the format will be as you have chosen—with or without field names present—and reporting to the screen in final form makes it easy to visualize printed reports without having to print samples.

Organize also allows you to store your records in packed or unpacked form. Packed, of course, takes up less room on the data disk, making it possible to store more records per disk. Since the number of records in a file can be as high as four billion, this feature could become important. (If you intend to do a twenty-deep sort on a file of that size, bring a lunch.) Those of you who have been honing for the means to keep a name and address file on the entire population of Earth can now get to work.

So far as statistics are concerned, Organize allows up to 128 fields per record and up to 254 characters per text field (16 digits for numeric fields). Sorting can be done on any field and multiple sorts can use all fields, up to the maximum of 128.

Since it is not a relational database, only one file and one index can be opened at a time. When an index is open, that information is displayed at the top of the screen, along with the field name on which you've specified the index to act. If the index is open as you enter records, each is automatically

continued on page 234

Amiga Workbench

continued from page 218

Though this operaton is quick enough, the checking process is rather slow. A good fix is to alter the startup-sequence (on your working copy) to assign the dictionary to RAM:. Once in RAM:, the checking is as fast as any I've ever seen.

This process does use up memory, the size of the Dictionary file being 109K. On a 512K Amiga, this leaves you with a document window of 16K (the default window) and you may open another window of up to 64K—not bad, when all things are considered.

For the Mail-merge function, you may create name and address files with Scribble! and then, through the use of dot commands, have information from those files printed in the appropriate places in a form letter.

An alternative to automatic insertion is a command that will stop the printing process while Scribble! asks you for a name of any other item of information you may have indicated for that point in the letter, giving you time to type the information in at that point.

Other changes in the program are the addition of key commands to access several routines previously available only by pulling down a menu; adding "word delete" and true backspacing; creation of project icons for saved files; and a new archive requester that automatically sorts saved files.

A change available only under Kickstart 1.2 is the addition of keyboard response to requester windows. Since these are single-key replies, response time is much quicker than pointing and clicking.

Though they have nothing to do with the operation of the program, we think mention should also be made of the new icons as they appear in Scribble!'s Workbench window. These are minor works of art and some animation has been added. (When you click on a drawer, the drawer slides open. When you select an application from that drawer, the drawer closes.) See Figure 3.

Scribble! 2.0 is available from Micro-Systems Software, 4301-18 Oak Circle, Boca Raton, FL 33431 and we understand it is being sent as an automatic upgrade to registered owners of the previous Scribble!

On the upgrade disk, a drawer labeled "Documents" holds printable files containing the changes in the program as well as separate files detailing the workings of SpellCheck and MailMerge.

And on that note we'll end our ramblings for this month. Have a terrific holiday and don't forget to write. I can be reached in care of *Computer Shopper*, P.O. Box F, Titusville, FL 32781. ●

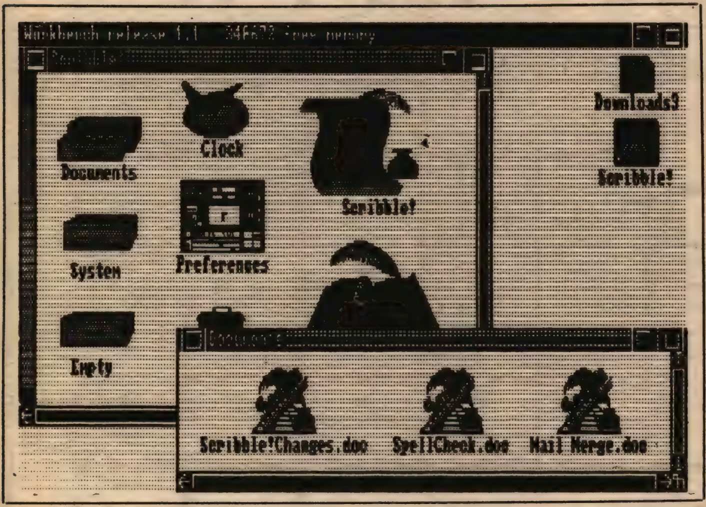

Figure 3

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Multi-Forth For The Amiga

Reviewed by Chris Dickman

I suppose it was inevitable that of the dozens of possible languages that could have been bundled with the Amiga, creaky old BASIC would turn out to be Commodore's choice. An argument can probably be made that, for better or worse, BASIC is the language familiar to most weekend code benders. At this very moment legions of Commodore 64 owners are hunched over their keyboards, painstakingly entering endless listings of dubious value, culled from magazines that should know better.

I'll be frank—I loath BASIC, but rather than lament Commodore's decision to bundle it with the Amiga I will say merely this—if you haven't already invested a lot of time and energy in BASIC (or C, for that matter) consider Forth for your Amiga program development. When properly implemented, Forth can squeeze the maximum amount of performance out of just about any hardware, from a Sinclair to a mainframe.

An Amiga Forth implementation makes good sense for a number of reasons, the most fundamental of which is the nature of the Amiga's processor, the Motorola 68000, which is well suited to threaded interpretive languages like Forth. This is due primarily to the chip's rich set of addressing modes and its consistent instruction set. Forth code is known for its compact size and fast execution as well as being easily relocatable, an essential feature in a multi-tasking machine like the Amiga. The interactive programming environment of Forth lends itself to an experimental approach when exploring the sound and graphics capabilities of the Amiga—the edit-compile-link-load cycle of C seems primitive in comparison. Much of the power of the Amiga can be tapped only through its many library functions. Some languages are more adept at handling libraries than others—Amiga BASIC, for example, provides only limited library access. Forth, on the other hand, gives the programmer complete access to all system software routines.

All this sounds fine in theory but of course a language is only as good as its implementation. There are several versions of forth available for the Amiga, ranging from bare-bones efforts like MVP-Forth to the more substantial UBZ Forth. But after working with Creative Solutions' Multi-Forth for the last few months, it's difficult to imagine a finer 83 Standard Forth for the Amiga. This one not only produces fast, compact code but provides a programming environment that's just short of luxurious. Multi-Forth's depth is no doubt due in part to Creative Solutions' past experience with Forth on 68000-based machines, including those from Hewlett-Packard, Motorola and Apple. Multi-Forth is a full 32-bit version of Forth that employs a direct token threaded internal structure that provides access to the full address space of the 68,000. While adhering to the 83 Standard should make porting of Multi-Forth applications to other micros (notably the Macintosh) a reasonable proposition, a slew of non-standard enhancements, some of them specific to the Amiga, transport Multi-Forth into the realm of elegance.

Take source code files. Since time immemorial, Forth programmers have put up with nasty, line-oriented editors that cram code into small, screen-oriented "blocks" stored in such a way that only Forth could access them. Multi-Forth thankfully uses source code in standard text files of unlimited length. This means that any text editor can be used to develop programs and thanks to the Amiga's multi-tasking, both the editor and Forth can be loaded and running at the same time; programming can't get much more interactive than this! No editor is provided with Multi-Forth but I'm content for the moment with ED and there are some interesting ones floating around the public domain I look forward to playing with in the near future. Support is also provided for block files for those old-timers too wooden-headed to change their ways—no wonder Forth programmers are thought of as a little odd.

Besides comprehensive library access, Multi-Forth adds full scaling and rotation to the existing Amiga graphics operators. A particularly welcome feature is the addition of a complete structures implementation, which makes the sometimes overwhelming process of handling Intuition functions much easier. Multi-Forth structures look and operate much like those employed by C. Since examples of their use dominate the Addison-Wesley technical manuals, material that would be inexplicable to a non-C programmer should make more sense in the light of Multi-Forth's structures. Organizing data into structures not only makes it easier to write but to read and maintain programs.

continued on page 235

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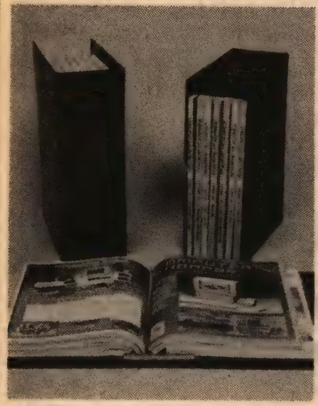

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MiAmiga Ledger

continued from page 228

This is a memory based system. In other words, the complete General Ledger file (Softwood refers to it as a database) resides in memory at one time. The size of a database, therefore, is dependent on the amount of memory present. Add-on memory is supported, as well as external disk drives and hard drives. In most cases, 512K will be sufficient memory. Multiple databases may be used, though only one may be used at a time.

MiAmiga Ledger has the ability to produce several types of reports geared to aiding one with financial analysis.

The "Chart of Accounts" report is user-customizeable, in that columns may be moved, expanded, hidden or sorted.

A Chart of Accounts is simply a list of accounts for personal or business use, differentiated by a number assigned to each account, as well as type of account. For example, one account would be for the cash in your checking account and another for the telephone. When entering a transaction, amounts are deducted from one account and added to another. This is known as "double entry," and both sides of the ledger must balance, i.e., show the same total, before the transactions can be posted to the ledger.

"Journal Entries" is another report which may be customized by the user in similar fashion to the Chart of Accounts.

A "Trial Balance Report" is normally done at the end of the month to ensure that no errors will be carried forward to the next month. This report contains account number, account description, beginning balance, adjustments made and ending balance. Totals are printed at the end of the report.

The "Balance Sheet" lists all asset accounts together with total, all liability accounts with total and owner equity accounts with total.

The "Income and Expense Statement" shows profit/loss for the accounting period. All income accounts are listed with the total income along with all expense accounts and their total. Net profit/loss is shown by subtracting total expenses from total income.

The "General Ledger" report, available at any time, shows accounts along with any transactions for these accounts during the current period. Beginning balance, journal entries and ending balance for the current period are shown.

Before the reports can be printed, though, one must get the data into the ledger.

MiAmiga Ledger's manual contains a step by step tutorial geared toward teaching the first time user just how that is done.

The tutorial begins with the setting up of an abbreviated Chart of Accounts for use during practice. Incidentally, it is highly unlikely that the user will have to set up the accounts from scratch in actual use, since the MiAmiga Ledger disk contains two databases with sample Charts of Accounts, one for business and the other for personal use. Additions and/or deletions may be made to these to tailor the user's own set of accounts. For learning purposes, however, it is better to type in the accounts as given in the tutorial.

Following entry of the practice Chart of Accounts, installation is performed. This process assigns a title for reports. Also, once installation has been performed, new accounts may be added to the Chart of Accounts, but removal of accounts is disabled. Nor may account numbers or types be changed after installation.

Next, journal entries are made which simulate information for a prior fiscal year. This would be entered, naturally, upon startup of a new ledger system.

This data is then posted to the ledger accounts and the fiscal year is closed.

Following this, further practice is provided in the form of some current accounts which can be entered and posted.

Journal entries of debits and credits do not directly affect the account balances in the General Ledger; these totals change only when the journal entries are posted.

After one or two runs through the tutorial, anyone smart enough to use a computer in the first place should be capable of using this system—it's that easy.

And just think... The next time you need a loan to finance your next BMW, if you hand that gimlet-eyed banker a professional-looking balance sheet it can't hurt your chances any and it may help a great deal if he is able to see your financial position at a glance.

The price of this package is only $99.99. Contrast that with accounting packages for other computers which are typically priced in the hundreds of dollars per module—and most are harder to use.

For further information, contact Softwood Company, P.O. Box 2280, Santa Barbara, CA 93120 and tell them you heard about it here. Or see your nearest Amiga software dealer. ●

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Organize!

continued from page 232

indexed; otherwise, you'll have to do it after the fact.

Having an index allows for much quicker sorting—provided of course that the sort is on the indexed field—as well as allowing fast retrieval of a given record by specifying unique information in the indexed field.

As we've come to expect from Micro-Systems, the documentation for Organize is excellent. Step-by-step tutorials take you through the complete operation and suggest a few uses for a database, while a reference section holds the rest of the answers. If the answer is not there, Micro-Systems maintains a hotline for those who can't wait to get an answer through the mail.

Now for a pet peeve: Database producers seem to think that the main use for their product will be name and address files for later use in mail merging and slant all their tutorials toward this end. (Organize, to give it credit, creates a payroll file of sorts. . . then shows you how to extract name and address for mailmerging with Scribble.) I really have no idea how widespread this practice is—a gut feeling tells me home use is probably close to nil—but I do know there are more uses for a database than the production of junk mail. It would be nice if some of these uses were at least hinted at in documentation.

Although it boasts compatibility with dBase II and III files (doesn't everybody?) Organize leaves it up to you to decide how to get the files from your MS-DOS machine to your Amiga. This is not to throw rocks at Organize, for other databases also seem to do all they can to also foster freedom of choice in this area. At any rate, the feature is there and we thought you might want to know.

In summing up, we find Organize to be a good, medium-power database. It can probably handle all but the most exotic of home applications and handle many small business applications as well. It does what it sets out to do, which is to provide an inexpensive, easy-to-use database management program that is designed for users who need more than a mailing list and less than dBase.

Organize is available from Micro-Systems Software at 4301-18 Oak Circle in Boca Raton, Florida and at a suggested list price of $99.95 512K is required. ●

Multi-Forth
continued from page 233

There are a lot of nice touches like this, such as "snapshot" feature that makes for painless customizing of the programming environment. A bare-bones Multi-Forth system can be loaded and favorite utilities bound into the system before being saved to disk for future use. There is also an extremely nice compiler for creating turnkey, bootable applications, a macro-assembler for optimization and trace and debug tools. While suitable for first-time Forth users, this is definitely a system for the creation of sophisticated, stand-alone applications (royalty-free) that make full use of the Amiga's unique capabilities.

At which point it should be pointed out that while access to the Amiga's hardware is provided via library calls there are some areas of hardware, such as audio, that are not directly supported yet by Multi-Forth. Happily, Creative Solutions seems committed to ultimately providing the complete, direct hardware control so dear to the hearts of Forth fanatics. The company maintains a bulletin board on CompuServe (GO FORTH, for the curious) that provides support for its Forth products as well as data libraries containing pertinent utilities and system extensions. This is just as well, since the otherwise commendable manual, as well as the system disks, are still a bit stingy in example programs and routines, despite the additional demos supplied with the recently released version 1.1. This version also added floating point and sprite tools.

If this review seems overly enthusiastic, it's due to my excitement at finally getting my hands on software that, instead of holding me back, imparts a sense of being a willing partner on a heady journey into the heart of the Amiga. If you're new to Forth, you'll need a book or two on the essentials and of course the complete Addison-Wesley manuals, without which programming the Amiga is unthinkable. While a disk of demonstration programs and examples is apparently in the works, access to the CompuServe Forth forum is still strongly recommended.

Hats off to Creative Solutions for providing us with Multi-Forth for the Amiga—for once a software company's name has proved to be more than mere hyperbole.

Multi-Forth for the Amiga $179. Creative Solutions, Inc. 4701 Randolph Rd., Suite 12, Rockville, MD 20852. ●

The Silver Box
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lists. In the past, some readers have skipped one or two lines in such lists and met with a bitter failure. If your disk does not boot after patching operation, examine line by line to check each and every character you have typed.

When the patching operation is completed, push the reset button to boot the computer from the patched disk.

The Protection Game

Big news in early September 1986 was that Ashton-Tate, one of the most successful software companies, dropped the protection from their software products. They must have realized that there is no win in the protection game. The protection scheme has had many frills in the trade and some concerns in the part of users who suffered forced labor of getting out the system disk and putting in the original, distribution floppy in the floppy drive as a key to start it. The inconvenience of this and other difficulties in the cumulative office manpower wasted in this manner has been a large factor in the office productivity.

On the other hand, it has fed many small enterprises in the disk backup software. The creation of protect scheme requires limitless ingenuity and pains in labor, while the technology of protection removal is relatively easy to undo the work of any protection in a scale of possibly 10 to 1.

Solving the mystery of protection challenges many intellectuals to no end. This is the most challenging game for the individuals endowed with some brain functions. I heard some Sanyo users complain that the new VB512 does not work with Release 1A, but the blame should not be on the hardware which has nothing to do with it. The fact is, as I heard from one of the people who are closely associated with Sanyo, that somebody in the Tokyo engineering department forgot to include this function, a version specific protection breaker which had been installed in the original Sanyo VB DOS which came with the old Video Board, the VB550.

The above problem has been solved long ago by Sanyo. What you should do is contact

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The Silver Box

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The September *SNUG* newsletter recently published an unprotect patch for the Release 1A devised by an irritated customer. By looking at the patch I feel it may not work for some users. If it does not work, you can purchase an unprotected program costing $50.00 and up. Or, if you look at the patch mentioned above carefully, it will give you a good hint of how to do it. The patch which appeared in the newsletter works on only one instruction and insert one "NOP." I was told by a neighborhood genius (name withheld by request) that, if you patch 12 places in the similar manner, you can get the same results as from a $50.00 protection remover software and the start up of the Release 1A becomes almost an instant without waiting for a verification, especially when you put the program in a RAM disk.

Please don't write me to get the name of the genius who came up with this real patch, unless you prove that you are the original purchaser of the Release 1A and you promise that you will abide by the copyright laws and your good intentions in using this patch.

By the way, the patch published in the *SNUG* newsletter uses DEBUG and the BASICA and a basic program to write two small files, one with no extension and one with a BAT extension. My suggestion is to use the COPY function of the DOS to write them.

Using BASICA, as it seems to me, is using your axe to shave your whiskers. That is lots of grinding for a little job. Forgive me, Mr. Bob Jack, but I think this analogy is right.

Under any circumstances, publishing an unprotect scheme may raise a number of eyebrows of people in the software publishing business except for the good people of Ashton-Tate. I just remain amazed at the courage displayed by *SNUG* and wish long lives for the copy protection, a game which might have untold entertainment values if you join in by purchasing a protected copy. You can purchase the remover software to help you enjoy the game. If you buy twins or mirror images you will be missing so much fun. By the way, if you want to contact *SNUG*, write to: *SNUG*, Box 3445, Moscow, ID 83843. There is no phone number.

A Floppy Is Not A Key

It should be noted that most high priced software are copy protected. You might have no problem with them, but the victims are your secretaries and you end up helping them in long hours. Then you realize the best way is to buy the copy protection remover available to anybody with $50.00 plus postage. Some people argued of disks having limited use life. I don't believe this is a problem. The most disks have long life. The magnetic heads in the drive may wear out sooner than the disks do.

I have seen a disk specifications which boast 3 million passes on a track. This translates to 166.67 hours on one track continously without stop, a long time. In order to spend this much accumulated time on one track in normal operations which inevitably involve multiple track access (Did you ever hear of a single track integrated software doing everything you need?) I assumed following calculations should be close enough to the real world.

I took two seconds as average time the head spends on a track in each access. The quotient of the 166.67 hours divided by two seconds/access is 30,000 accesses. If you use this particular track twice a day, the total time you can use this track is about 41 years of daily use. We are discussing a particular track in an application program. Probably, you will use the key floppy only when you load the program in the morning.

There is one problem in this assumption. If you use one disk continuously, and even if the disk is write protected, the disk may need reformatting, or a backup disk, every six months to a year of operation by various reasons; such as operator mistakes, line disturbances, contaminants on the recording surfaces, accidents, careless handling and the like. Most protection scheme use the original disk as a key. This creates an adverse relationship with the customer of the company. A key should not be as fragile as a floppy disk, while the customer can usually buy another key for about $50.00. This is a ridiculous situation for all software publishers.

The only remedy to this is to come up with an indestructible and ultimately reliable floppy (made of titanium metals?) and to ban the sale of protection remover software by enacting a federal law (state law is unfair to some people), while the former is possible and the latter is entirely questionable if you believe that the principal purpose of laws is to protect citizens and not to protect special interests only.

SideKick And The Sanyo

Except for the old version of SK.COM, SideKick does not go easy in the Sanyo, due to the good meshing with the IBM hardware. This is an effort of

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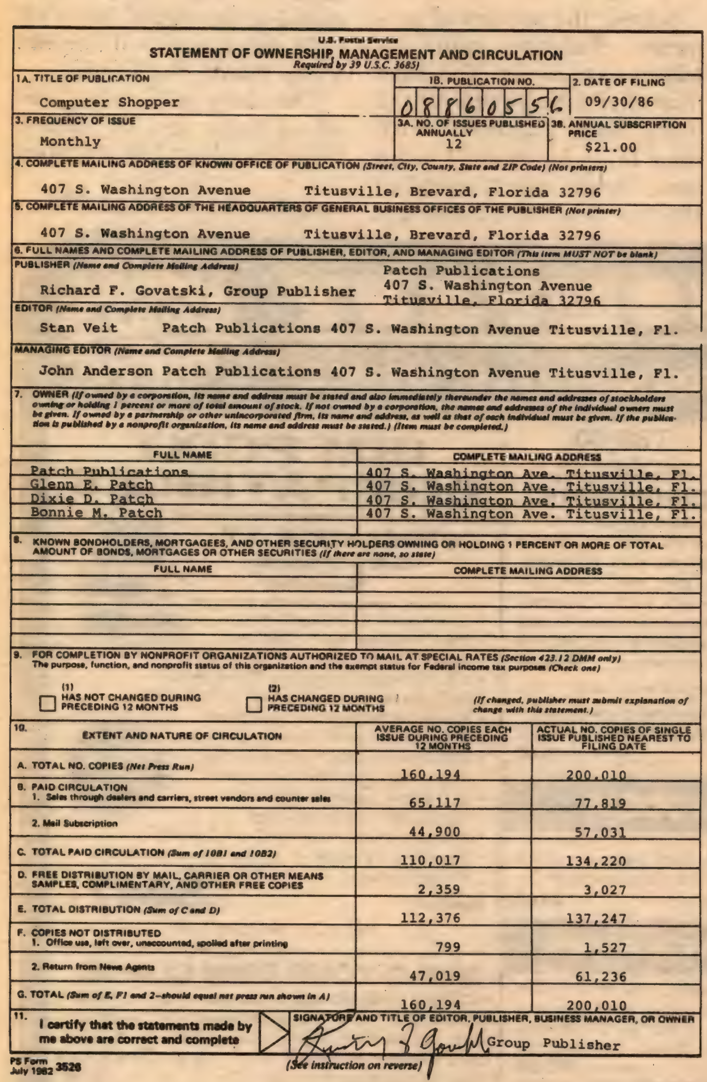

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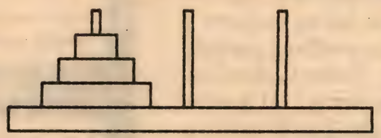

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Sanyo/IBM WordFun! Is Fun

by Fred Blechman

I didn't buy my Sanyo MBC 550 to play games. Of course, I couldn't resist running some of the fantastic Sanyo games from MichTron (576 S. Telegraph, Pontiac, MI 48053; (313) 334-5700) just to see the great color programming and arcade action possible iwth the plain-vanilla 550.

So when I received a demo-disk of WordFun! from Overt Strategic Simulations, I wondered if I should spend my time reviewing it. Since it was originally designed for the IBM PC, I assumed I'd have nothing but problems with it on the Sanyo. Now, many hours later, I can report that WordFun! is challenging, educational, and Fun—and runs perfectly on the Sanyo!

Description

WordFun! is actually two different word games, both provided on one disk, together with a detailed tutorial that "plays" both games. The program is written in the "C" language and compiled, so it runs on any MS-DOS machine. However, the programmer has taken special care to avoid the use of the IBM ALT key, and allows the top row of keyboard numbers to act as function keys. Therefore, MS-DOS computers like the Sanyo 55X, whose keyboards lack the ALT key and ten specific function keys, can still run the program.

Also, as can be seen from the opening screen (Figure 1), Overt Strategic Simulations creates simulated graphics using standard IBM characters, blocks and symbols, so no special graphics hardware is needed.

Description

The first word game is similar to some word games on television. A typical screen (Figure 2) has a Main Menu to show the use of the function keys, and four boxed words with the letters jumbled. At the bottom of the screen is an "empty" set of boxes representing a phrase with the definition printed below it. As each of the jumbled words is solved, letters are added to the phrase boxes at the bottom. The object is to "solve" the scrambled words and then the bottom phrase.

For example, in Figure 2, the first jumbled word is Borrow, the second is Initial, the third is Rumor and the fourth is Dazzle. The solution to Portable Radio Set is Walkie-Talkie. Figure 3 shows another sample, with Space Shuttle as the solution. The first jumbled word is Ancient when unjumbled.

Not obvious in the screen dumps of Figure 2 or 3 is that when you solve a jumbled word it is automatically replaced with another jumbled word and at least one letter is added to the mystery phrase at the bottom. You may have to solve many jumbled words to get enough "clues" to decipher the phrase.

The second word game is Find Word. Figure 4 shows a typical screen. A grid of letters 18-across by 20-high contains the 20 words shown at the left side of the grid. These words are hidden in the grid either vertically, horizontally or diagonally, either up or down, or left or right reading. The object is to move the cursor (using the arrow keys) and "mark" the beginning and end of each hidden word. The marked letters are highlighted on the screen. If the found word is judged correct it is reverse-printed in the word list, as shown for the word Dazzle in Figure 5. This word starts at Column 7 Row 7 with the letter D and ends at Column 2 Row 2 with the letter E. On a color screen, the marked word is yellow and the other letters in the grid are light blue. The Find Word Menu at the left side of the screen describes the use of each function key.

Installation

Before using WordFun! you must install both the Tutorial and WordFun! programs to display properly on your computer. You type SETUP (a batch file) and press the ENTER (RETURN or down-left arrow) key. The Tutorial program is installed first.

You will be asked if you want Screen Installation or Quit. Press S for Screen. Six choices are now shown, from 0 for Default Display Mode to 5 for B/W Display 40x25. I used Number 2, Color Display 80x25, for the Sanyo and it worked perfectly. My RGB monitor displayed white, yellow, red and light blue, and the monochrome monitor showed four shades of brightness ("white" the brightest, "red" the dimmest. The Sanyo computer internal switches were set to defeat blinking, as described on pages 129-131 of my book, *Sanyo MBC 550/555 Beginner and Intermediate Guide*. (Ed: This book, together with a disk of 56 programs in the book, is available from the author postpaid in U.S. and Canada for $30. Call (818) 346-7024 in Canoga Park, California.)

When used on an IBM PC clone with a Hercules monochrome board and a monochrome display, this same Setup showed only two brightness levels, but was perfectly usable.

If you are using a Sanyo 55X with a monochrome monitor and have not set the internal switches to prevent blinking, use Number 1 Monochrome Display as your Setup choice. This will give you two levels of brightness and no blinking.

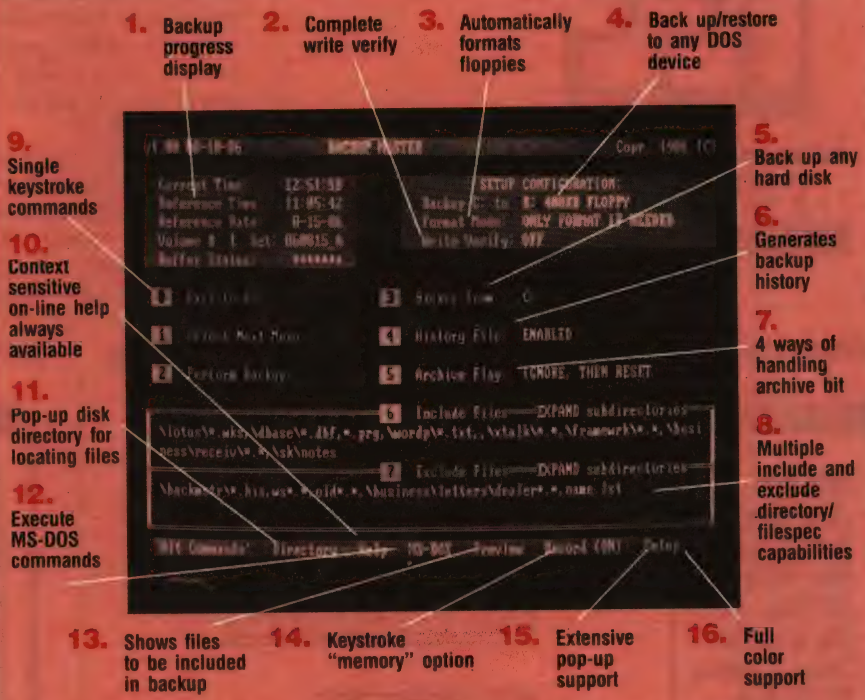
Next you press Q to quit the Tutorial setup, and the batch file continues on to install the WordFun! program in the same way. You are now ready to run either Tutorial or WordFun! I recommend you run Tutorial first. It is very well done, and automatically "enters" the right keystrokes.

Using WordFun!

After running the tutorial, type WordFun! and hit ENTER. The program starts with Figure 1, asking for a Password. Since several users can play, and each game is saved on disk for future continuation, a password system may be used. This is a three-character code determined by the user. Or you can just press ENTER for no password.

Now a screen like Figure 2 will appear. WordFun! is written so that nearly all operations can be accomplished with the function and arrow keys.

continued on page 238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2. Complete write verify
3. Automatically formats floppies
4. Back up/restore to any DOS device
5. Back up any hard disk
6. Generates backup history
7. 4 ways of handling archive bit
8. Multiple include and exclude directory/ filespec capabilities
9. Single keystroke commands
10. Context sensitive on-line help always available
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Sanyo/IBM
continued from page 237

Function keys F1-F10 may alternately be entered with the number keys along the top of the keyboard, with 0 equivalent to F10. For example, on a Sanyo, F10 is normally activated by holding down the SHIFT key and the PF5 key together. This will toggle the timer ON and OFF in the program, but how will you get a SHIFT F10 to reset the timer? You simply use SHIFT 0. To go to the Find Word game, press F9 (or 9).

It's up to you to descramble the words. The arrow keys move the cursor to the "active" word. You can have the computer randomly rearrange the letters in the active word by pressing F5. You can type the word as you think it should be, using F1, or rearrange the letters in a word one-by-one, using F3 and F4. The word is judged with F2. If it is correct, one or more letters will be added to the mystery phrase at the bottom, and a new jumbled word substituted for the one you just solved.

Eventually, you solve the phrase word(s) at the bottom, and a new mystery phrase and definition appear. You can play this game endlessly, select an entirely new category (F7 allows the selection of General, Geography, Plants & Animals or Science & Nature words), or start a whole new puzzle with F6.

Key F8 is used when you are ready to give up and want the active word solved. However, you need a special password supplied by Overt Strategic Simulations for $5! This password is good for all words in the puzzle.

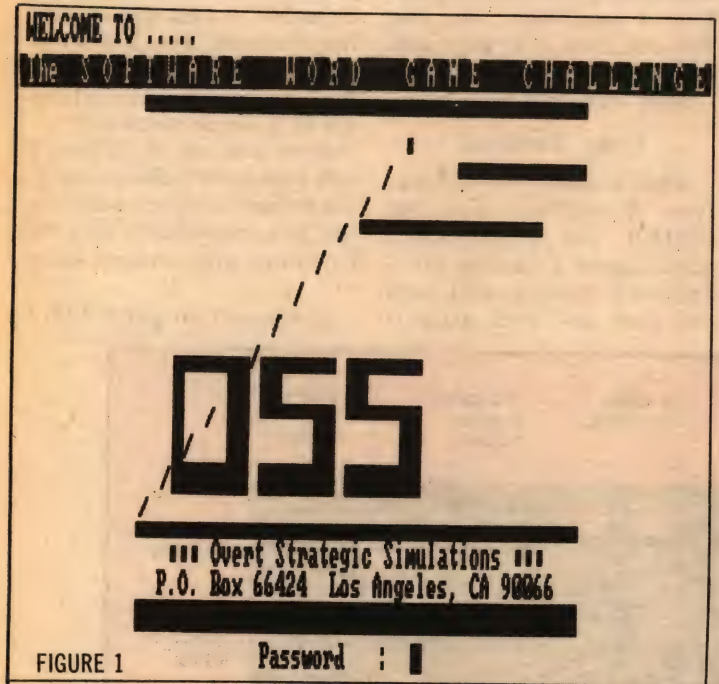
For an added individual challenge, or for competition with another player, the on-screen timer can be turned on and off or reset, as described above. If you exit to DOS with ESC, the present puzzle is saved on disk with the current password in a file called RESTORE.DAT.

Using Find Word

If you press F9, the Find Word game (Figure 4) appears on the screen, with its own menu of key functions. Here F6 toggles the timer, and SHIFT 6 resets the timer. The beginning and end of words hidden in the grid are marked with F1 and F2 after moving the cursor with the arrow keys to the desired character. F3 judges the correctness of the marked word, and F4 gives you a whole new grid.

Summary

Of the two games, the jumbled-words game is tougher, but both is challenging, addictive, and fun. The demo program I tested ran smoothly and quickly on both the Sanyo 55X and an IBM PC clone, with no apparent difference in screen speed. The demo program intentionally has a limited vocabulary, making things easier after seeing many of the words repeated. The actual program, with a full database of words and phrases, is available for $19.95, plus $1.25 for shipping and handling, from OSS, P.O. Box 66424 Dept. 112, Los Angeles, CA 90066. ●



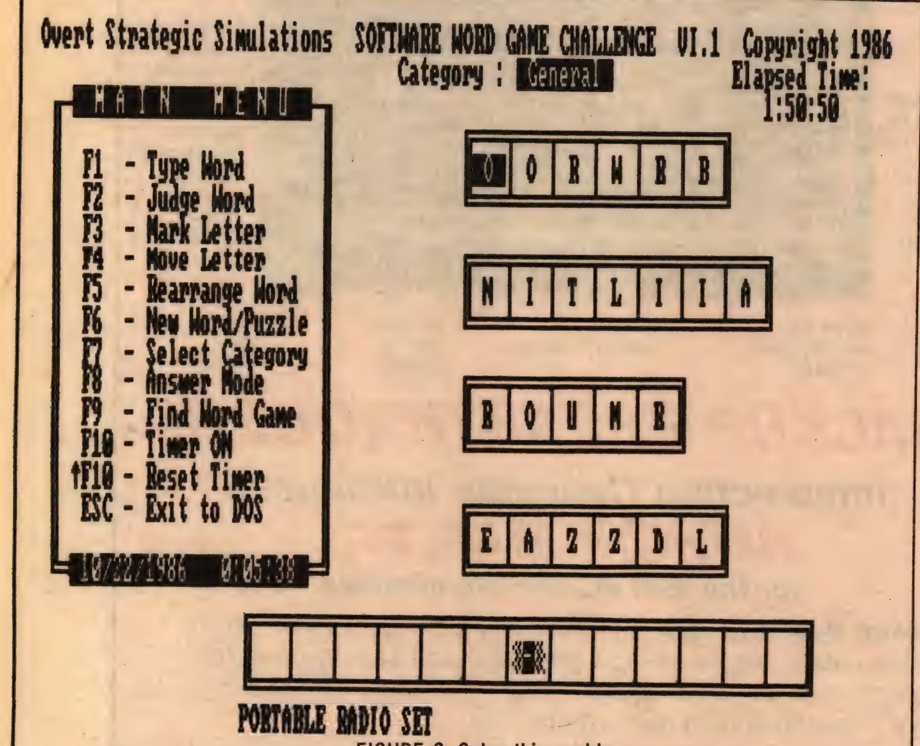
WELCOME TO .....

The SOFTWARE WORD GAME CHALLENGE

::: Overt Strategic Simulations :::
P.O. Box 66424 Los Angeles, CA 90066

Password :

FIGURE 1



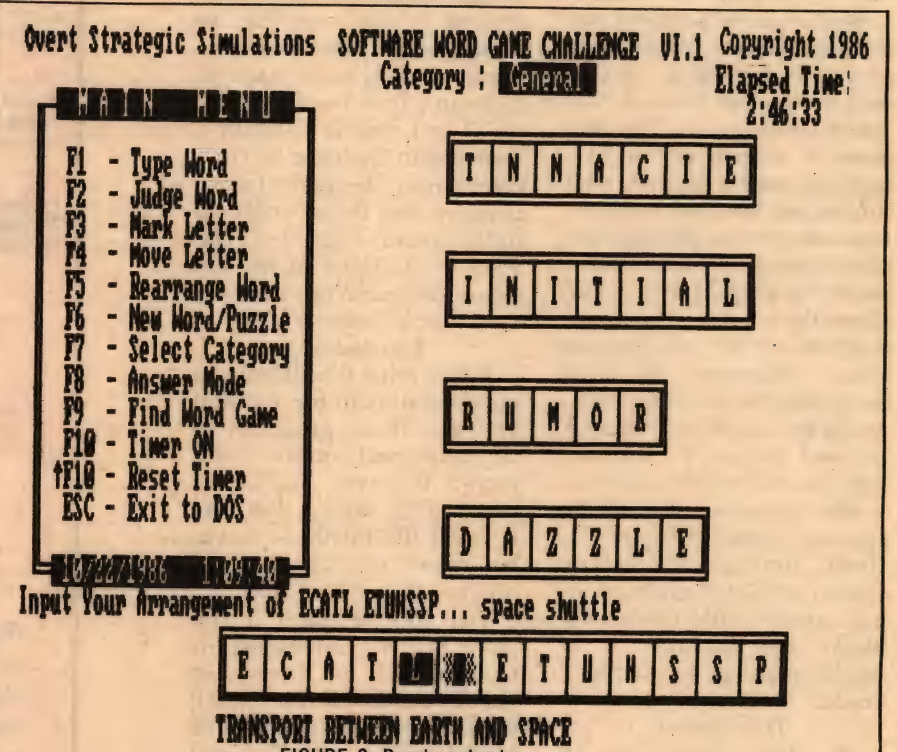
Overt Strategic Simulations SOFTWARE WORD GAME CHALLENGE VI.1 Copyright 1986
Category : General
Elapsed Time:
1:50:50

MAIN MENU
F1 - Type Word
F2 - Judge Word
F3 - Mark Letter
F4 - Move Letter
F5 - Rearrange Word
F6 - New Word/Puzzle
F7 - Select Category
F8 - Answer Mode
F9 - Find Word Game
F10 - Timer ON
↑F10 - Reset Timer
ESC - Exit to DOS

```
O O R W R B
N I T L I I A
R O U M R
E A Z Z D L
```

PORTABLE RADIO SET

FIGURE 2: Solve this problem.



Overt Strategic Simulations SOFTWARE WORD GAME CHALLENGE VI.1 Copyright 1986
Category : General
Elapsed Time:
2:46:33

MAIN MENU
F1 - Type Word
F2 - Judge Word
F3 - Mark Letter
F4 - Move Letter
F5 - Rearrange Word
F6 - New Word/Puzzle
F7 - Select Category
F8 - Answer Mode
F9 - Find Word Game
F10 - Timer ON
↑F10 - Reset Timer
ESC - Exit to DOS

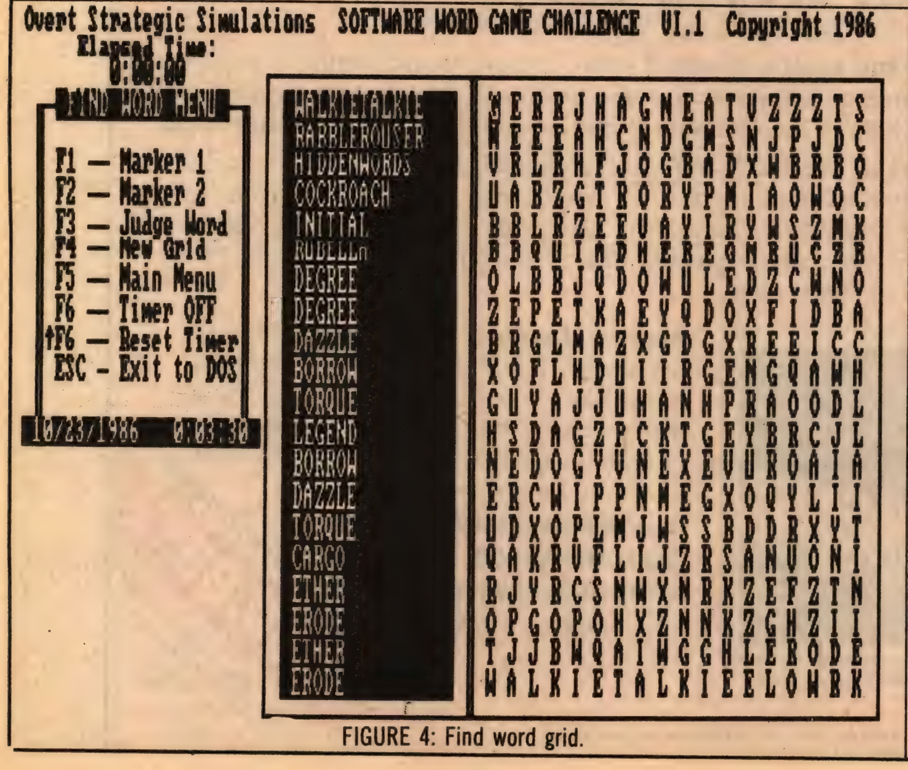
```
T N N A C I E
I N I T I A L
R U M O R
D A Z Z L E
```

Input Your Arrangement of ECATL ETUHSSP... space shuttle

```
E C A T L   E T U H S S P
```

TRANSPORT BETWEEN EARTH AND SPACE

FIGURE 3: Puzzle solved.

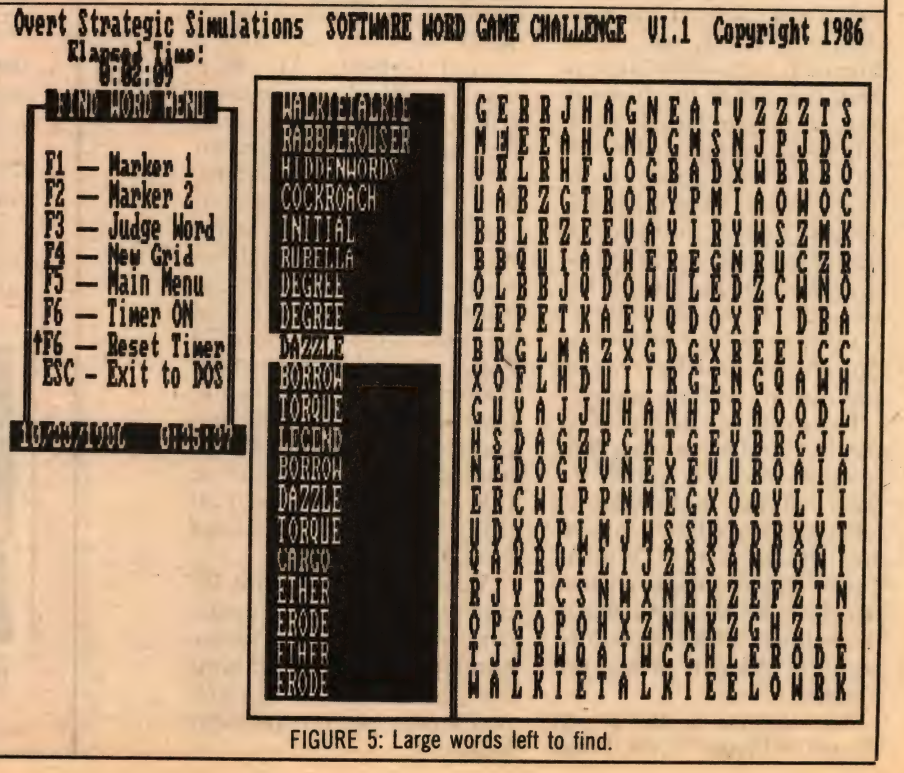


Overt Strategic Simulations SOFTWARE WORD GAME CHALLENGE VI.1 Copyright 1986
Elapsed Time:
0:00:00

FIND WORD MENU
F1 — Marker 1
F2 — Marker 2
F3 — Judge Word
F4 — New Grid
F5 — Main Menu
F6 — Timer OFF
↑F6 — Reset Timer
ESC - Exit to DOS
10/23/1986

```
WALKIETALKIE     W E R R J H A G N E A T V Z Z Z T S
RABBLEROUSER     W E E E A H C N D G M S N J P J D C
HIDDENWORDS      V R L R H F J O G B A D X W B R B O
COCKROACH        U A B Z G T R O R Y P M I A O W O C
INITIAL          B B L R Z E E V A Y I R Y W S Z M K
RUBELLA          B B Q U I A D H E R E G N R U C Z B
DEGREE           O L B B J Q D O W U L E D Z C W N O
DEGREE           Z E P E T K A E Y Q D O X F I D B A
DAZZLE           B R G L M A Z X G D G X R E E I C C
BORROW           X O F L H D U I I R G E N G Q A W H
TORQUE           G U Y A J J U H A N H P R A O O D L
LEGEND           H S D A G Z P C K T G E Y B R C J L
BORROW           N E D O G Y V N E X E V U R O A I A
DAZZLE           E R C W I P P N M E G X O Q Y L I I
TORQUE           U D X O P L M J W S S B D D R X Y T
CARGO            Q A K R V F L I J Z R S A N V O N I
ETHER            R J Y R C S N W X N R K Z E F Z T N
ERODE            O P G O P O H X Z N N K Z G H Z I I
ETHER            T J J B W Q A I W G G H L E R O D E
ERODE            W A L K I E T A L K I E E L O W R K
```

FIGURE 4: Find word grid.



Overt Strategic Simulations SOFTWARE WORD GAME CHALLENGE VI.1 Copyright 1986
Elapsed Time:
0:02:09

FIND WORD MENU
F1 — Marker 1
F2 — Marker 2
F3 — Judge Word
F4 — New Grid
F5 — Main Menu
F6 — Timer ON
↑F6 — Reset Timer
ESC - Exit to DOS

```
WALKIETALKIE     G E R R J H A G N E A T V Z Z Z T S
RABBLEROUSER     M   E E A H C N D G M S N J P J D C
HIDDENWORDS      V R L R H F J O G B A D X W B R B O
COCKROACH        U A B Z G T R O R Y P M I A O W O C
INITIAL          B B L R Z E E V A Y I R Y W S Z M K
RUBELLA          B B Q U I A D H E R E G N R U C Z B
DEGREE           O L B B J Q D O W U L E D Z C W N O
DEGREE           Z E P E T K A E Y Q D O X F I D B A
DAZZLE           B R G L M A Z X G D G X R E E I C C
BORROW           X O F L H D U I I R G E N G Q A W H
TORQUE           G U Y A J J U H A N H P R A O O D L
LEGEND           H S D A G Z P C K T G E Y B R C J L
BORROW           N E D O G Y V N E X E V U R O A I A
DAZZLE           E R C W I P P N M E G X O Q Y L I I
TORQUE           U D X O P L M J W S S B D D R X Y T
CARGO            Q A K R V F L I J Z R S A N V O N I
ETHER            R J Y R C S N W X N R K Z E F Z T N
ERODE            O P G O P O H X Z N N K Z G H Z I I
ETHER            T J J B W Q A I W G G H L E R O D E
ERODE            W A L K I E T A L K I E E L O W R K
```

FIGURE 5: Large words left to find.

The Silver Box

continued from page 236

Borland to make it compatible in almost any screen environment provided by the various application software. I have purchased SideKick Version 1.56A, the copy protected version. The reason is simple. You get more for your money by paying less.

I am sure you understood what I meant by the above sentence. The copy protected software is tested more thoroughly and is produced with much more devotion and lots of good codes than the ordinary unprotected versions. The more copy protection you throw in, the more frail is the reliability of the software, as a rule of the thumb and the producers must over come this difficulty.

As I reported in 1985, SideKick Version 1.56A did not work in my Silver Box. If you load the program it clears the screen and the system hangs. At the time I casually accepted my temporary defeat. There has been so much to be done in the hardware and the amount of memory I had was only 256K. The smallest module of SideKick requires at least 24K and there was not much memory to spare to begin with. Besides, I had SideKick working perfectly in my other computer, a PC-clone.

My neighborhood genius had suggested I could have bought the unprotected version for only a few dollars more than $29.00 I paid in one of the discount places. But, I told him I had some other ideas.

"If you do that, you would be missing out on a very interesting job of making it work in your computer!"

Maybe I should have bought the unprotected version of SideKick, Version 1.52A. It could be easier to make the program work than the protected one, but, you would have had less return. If I am going to use it in my business, I make a point of buying unprotected software. I do not care much if it is copy protected or not when the user is limited to the purchaser. But, if the software is for his secretary, or some other employee to use, the situation is quite different. This is a situation in which many people buy the protection remover software.

The September 1986 *SNUG* newsletter published a small patch to the original SideKick patch named SKGO.COM to let the unprotected version of SideKick run on Sanyo 550/555. I assume it will run. I say this because I only have the copyprotected version. Recently, I found a need to run the SideKick in my expanded and accelerated Silver Box. Now I have enough memory, about 100K more than the MSDOS standard 640K, with speed at least halfway approaching that of an AT PC.

I asked my neighborhood genius to help me by loading SideKick with DEBUG and tracing every jump and call. This meant that we really started to read the copyrighted material, not just using it as I was doing until this moment. There is no point of copyrighting the material unless people read it.

Every time I see a marvelous patch, I wonder how and what steps the author had to take to write it. My reading is limited, and I think this is because of it, but I do not recollect I ever read such an account. Now, he is showing me how to do it.

He first looked at location 100H, the starting point of most programs. It showed a jump to 417H. After a half dozen jumps and calls, he arrived at 4596H and declared this as the portion of software where the problem is hidden. He typed, – [L] to reload the program, and then typed – [G, 4596] and the execution of the program started and it stopped at the address 4596H. DEBUG showed the contents of all CPU registers. He said, "See, no problems up to this point."

Then he typed, – [G, 45C0] and pushed the return key. The next instant, the break point is reached and all the registers were displayed again. "So far, so good!" was his expression. The IP, the Instruction Pointer is pointing to 45C0H.

This experiment will continue next month. We will see how to adapt a small module of SideKick Version 1.56A to the Sanyo environment. ●

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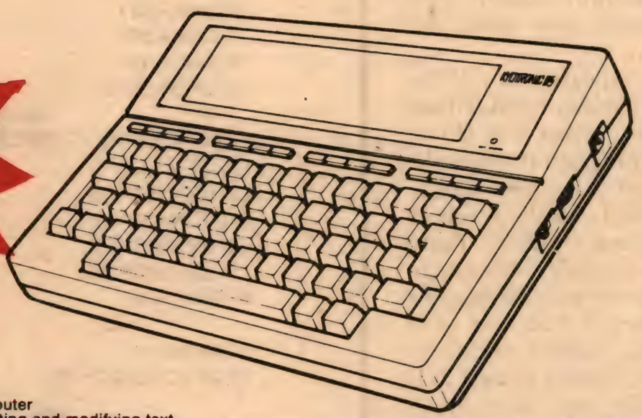

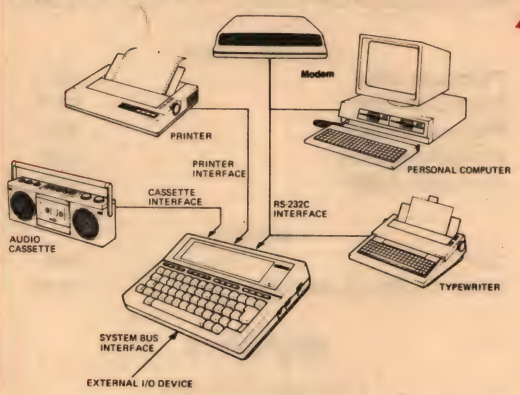

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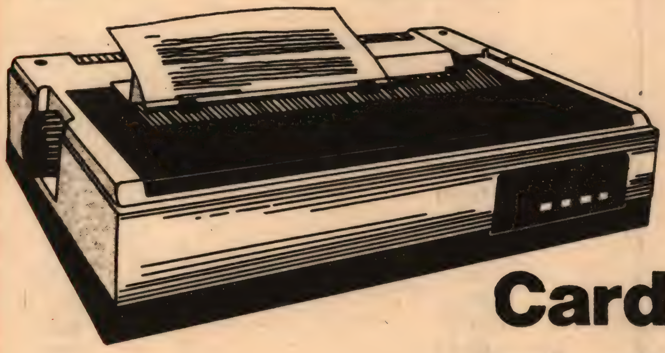

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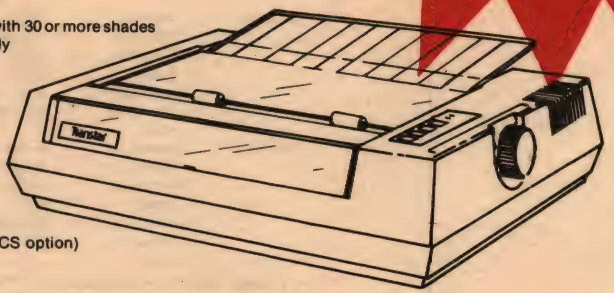
Dot Pitch: 1/80 inch(H) X 1/80 inch(V)
Line Spacing: 1/6 inch, 1/8 inch, n/20 inch increments (nU0-99), under program control
Paper Feed: Tractor or friction feed
Paper Type: Fanfold or single sheet
Paper Width: 10 inches maximum
Number of Copies: Original plus two copies
Ribbon: 4-color cartridge
Ribbon Colors: Black, magenta, yellow, and cyan
Printable Colors: 7 colors (ribbon colors plus green, orange, and violet), with 30 or more shades
Print Head Life: 80 million characters when each hammer is used equally
MTBF: 2,500 hours, independent of print head
Noise Level: Less than 60 dB(A)
Dimensions: 17.7"(W) X 4.5"(H) X 12.6"(D)
Net Weight: 11 lbs.
Power Requirements: 120 VAC 60 Hz 1.5 amps
Power Consumption: Operating 20-25 watts, Idle 5-10 watts
Interfaces: 8 bit parallel (standard),
RS 232C serial (optional)
Apple® II/IIe PICS (optional)
Connector: Amphenol 36 pin-Centronics compatible
Control Panel Switches: Line Feed, Form Feed, Stop, Copy (requires PICS option)
Control Panel Indicators: Power, Paper, Empty, Copy
Limited Warranty: 6 months parts and labor to end user.



Item	Price	Shipping, Processing, Handling
Transtar 315	$149.95	$18.00
RS-232C Interface Card	$ 19.95	N/C With Major Purchase
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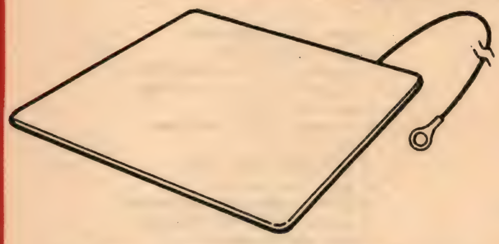

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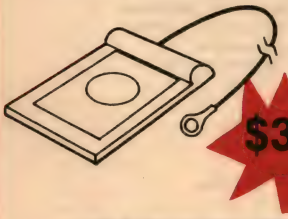

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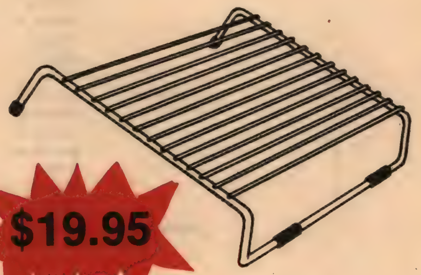

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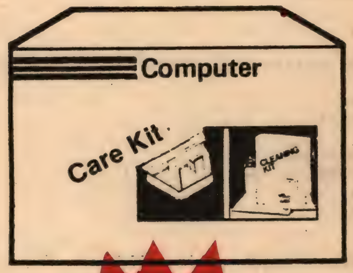

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Listing 1

```c
#include <osbind.h>
#include <stdio.h>

/* a short program to demonstrate screen switching */

/* here we have some globals used by the program */
char dbuf2[32256];
long bf1;
long bf2;
long lbf1;
long lbf2;

main()

{
clearall();

swtch(bf2,lbf2);
printf("This is the first message to screen 2.\n");

swtch(bf1,lbf1);
printf("This is the first message to screen 1.\n");

swtch(bf2,lbf2);
printf("This is the second message to screen 2.\n");

swtch(bf1,lbf1);
printf("This is the second message to screen 1.\n");

swtch(bf2,lbf2);
printf("This is the third message to screen 2.\n");

swtch(bf1,lbf1);
printf("This is the third message to screen 1.\n");

swtch(bf2,lbf2);
delay(10000);
swtch(bf1,lbf1);
delay(10000);
}
VOID clearall()
/* this routine is used to clear all the extra
   display buffers */
{
long algnbuf();


bf1 = Physbase();
lbf1 = Logbase();

bf2 = (long) dbuf2;
bf2 = algnbuf(bf2);
lbf2 = bf2;
clrbuf(bf2);
}


VOID clrbuf(l)

long l;

/* this routine will clear a screen buffer */
{
char *p;
int i;

p = (char *) l;
for (i = 0;i < 32257;i++) *p++ = '\0';
}
long algnbuf(p)

long p;

/* this routine will return a page aligned long */
{
long rem;
long diff;

rem = p % 256L;
diff = 256L - rem;
p += diff;
return(p);
}
VOID swtch(base,log)
long base;
long log;
/* this routine switches the display buffer to the
   new address    */
/* this causes a new portion of memory to be displayed
   on the CRT */
/* and alters where in memory things are bit mapped        */
{
long temp;
long raw;
char part1;
char part2;

/* first we turn off the cursor */
Cursconf(0,0);
Vsync();
Vsync();

/* perform our masking */
raw = base >> 8;
temp = raw & 0x00ffL;
part1 = (char) temp;
raw = raw >> 8;
temp = raw & 0x00ffL;
part2 = (char) temp;
/* switch the logical base address */
pokel(0x44eL,log);

/* do the actual physical base switching  */
pokeb(0xffff8203L,part1);
pokeb(0xffff8201L,part2);

/* the last thing to do is to turn the cursor back on */
Cursconf(1,0);
Vsync();
Vsync();
}
```

Hacking the ST

continued from page 113

I have several words of warning about playing around with switching the bit map with poked values. First, the VT 52 emulator used by the ST is a little funny. As far as it is concerned, there is only one real bit map. The VT 52 emulator will treat any bit map as valid for writing text to, but the first bit map that text is written to is the only one that can ever have a cursor in it.

The second warning concerns switching the logical address (where bit map operations take place) without switching the physical address (the bit map actually displayed). If you switch the logical address without switching the physical address, your first text message may not appear in the proper bit map. The second and subsequent operations always seem to work, but for some reason, the first bit mapping can appear in the wrong bit map.

Another thing to watch for, if you switch the logical and physical addresses separately, you can sometimes get 10 bombs on the screen. If you look up this exception in your 68000 manual, you notice that it is the linea exception. On the ST the linea exception is normally used for performing graphics primitives! It seems

continued on page 243

Listing 2

```
*
* updated 09/24/86 to use supervisor mode for peek and poke
*
.globl      _peekb
.globl      _peekw
.globl      _peekl
.globl      _pokeb
.globl      _pokew
.globl      _pokel
.globl      _delay
*
* here is a series of peek functions, one
* each for byte, word and long
*
*
*
_peekb:     move.l      4(sp),a3                  * get address
            move.l      #peekbx,-(sp)             * push routine address
            move.w      #38,-(sp)                 * push function number
            trap        #14                       * do xbios call
            addq.l      #6,sp                     * reset stack pointer
            move.b      d3,d0                     * move data to return register
            rts
_peekw:     move.l      4(sp),a0                  * get address
            move.l      #peekwx,-(sp)             * push routine address
            move.w      #38,-(sp)                 * push function number
            trap        #14                       * do xbios call
            addq.l      #6,sp                     * reset stack pointer
            move.w      d3,d0                     * move data to return register
            rts
_peekl:     move.l      4(sp),a0                  * get address
            move.l      #peeklx,-(sp)             * push routine address
            move.w      #38,-(sp)                 * push function number
            trap        #14                       * do xbios call
            addq.l      #6,sp                     * reset stack pointer
            move.l      d3,d0                     * move data to return register
            rts
* these short routines do the actual peek
* they are run in the supervisor mode to
* avoid the 2 bomb syndrome
peekbx:     move.b      (a3),d3                   * get the byte
            rts
peekwx:     move.w      (a0),d3                   * get the word
            rts
peeklx:     move.l      (a0),d3                   * get the long
            rts
*
* here are the poke functions to go with the above
*
_pokeb:     move.l      4(sp),a3                  * get the address
            move.b      9(sp),d3                  * get the byte
            move.l      #pokebx,-(sp)             * push routine address
            move.w      #38,-(sp)                 * push function number
            trap        #14                       * do xbios call
            addq.l      #6,sp                     * reset stack pointer
            rts
_pokew:     move.l      4(sp),a3                  * get the address
            move.w      8(sp),d3                  * get the word
            move.l      #pokewx,-(sp)             * push routine address
            move.w      #38,-(sp)                 * push function number
            trap        #14                       * do xbios call
            addq.l      #6,sp                     * reset stack pointer
            rts
_pokel:     move.l      4(sp),a3                  * get the address
            move.l      8(sp),d3                  * get the long
            move.l      #pokelx,-(sp)             * push routine address
            move.w      #38,-(sp)                 * push function number
            trap        #14                       * do xbios call
            addq.l      #6,sp                     * reset stack pointer
            rts

* these short routines do the actual poke
* they are run in the supervisor mode to
* avoid the 2 bomb syndrome
pokebx:     move.b      d3,(a3)                   * poke the byte
            rts
pokewx:     move.w      d3,(a3)                   * poke the word
            rts
pokelx:     move.l      d3,(a3)                   * poke the long
            rts
*
* this routine returns after 1 millisecond
*
killms:     move.w       #274,d1                  * number of loops
killup:     tst.w        d1                       * check for completion
            beq          killret                  * if done...
            subq.w       #1,d1                    * one less loop
            bra          killup                   * and once more
killret:    rts
*
* this routine returns after x milliseconds
*
_delay:     move.w       4(sp),d0                 * number of milliseconds
delup:      tst.w        d0                       * check for completion
            beq          delret                   * if done...
            jsr          killms                   * wait a bit
            subq.w       #1,d0                    * one less loop
            bra          delup                    * and once more
delret:     rts
```

Hacking the ST

continued from page 242

that the linea routines are easily wrapped around the axle.

The last warning, if you switch the bit mapped areas, be sure and switch them back to their original settings before you leave the program, otherwise the desktop is sure to look very strange, and the odds are good that the machine will be locked up, forcing a reboot to regain control.

I received a couple of items the other day that could be of interest to any hackers working with the ST. Otto Baade of BigFoot Systems/eSTe sent samples of their realtime clock module and a ROM board they developed.

The eSTe Clock plugs into the cartridge port of the ST, and is powered by a lithium battery that is good for 5 years. There are two programs supplied by BigFoot Systems/eSTe, CLK.ACC and SETCLK.PRG.

CLK.ACC must be copied to your boot disk. Once everything is in place, everytime your ST is powered on, the system clock is set from the eSTe clock. CLK.ACC also allows you to get the correct time by clicking on eSTe Clock entry in the desk menu. The time is displayed in a simple one line window.

The nice thing about the CLK.ACC supplied is the size. The CLK.ACC program is only 2967 bytes long, and even I don't mind tying up less than 3K to have a battery backed up clock. There is a small drawback, the time is not updated, it gives the correct time when you hit the eSTe Clock menu item, and if you later want the correct time, you have to select eSTe Clock again.

SETCLK.PRG allows you to set the time and date of the eSTe Clock. This only needs to be done once, so SETCLK.PRG does not have to be kept on your boot disk.

About the only drawback I could find with the eSTe Clock is its size. The clock module is about 2 inches deep, an inch and a half high and 4 and ¾ inches long. When you plug it into the cartridge port of the ST, it sticks out about 3 and ¾ inches. Since we have the floppy drives to the left of the ST on our systems, we had to move the drives over another 2 inches to make room for the clock.

The eSTe Clock also has two empty EPROM sockets for your use. If you're looking for ROM sockets for the ST, your best bet is the Bigfoot/eSTe ROM. This is a PC board with 4 EPROM sockets and a plastic case similar to the one used by the eSTe Clock.

The case is two piece ABS plastic and simply snaps apart and together. The cases are the same color as the ST and are shaped so that they can only be plugged in one way. There are recessed areas on the top and bottom of the case where labels can be applied. The case rests on the same surface as the ST, which insures that the connector is not under stress.

The ROM cartridge takes 27128 or 27256 EPROMS with a single jumper determining the type. Since the data path on the ST is 16 bits wide, it takes 2 EPROMS for each memory range. The two pairs of sockets are addressed at FA0000 and FB0000 hex.

The actual dimensions of the case are: 4.8 by 2.1 by 1.4 inches. The eSTe Clock is $48.50 plus $3.50 shipping. The ROM board is $15 plus $2.50 shipping. Quantity prices for OEMs are available.

To order or get more information, write to: BigFoot Systems/eSTe, 2708 E Lake St., Suite 207, Minneapolis, MN 55406; (612) 722-9515.

Before the eSTe Clock arrived, I had gotten along fine without it. I put the clock on the company BBS (which needs the time and date set to work properly) and now I'm going to have to go out and buy 2 or 3 for the rest of our systems. You don't know how nice it is to always have the correct time and date stamped on each file when you are doing software development.

I try to remember to set the time and date when I power a machine up, but in the heat of battle, you don't always remember to do such things, and so most of my files have garbage time and date stamps. $48.50 is a cheap way to insure that the files are always stamped with the correct time and date. No more looking through source files and scratching my head, from now on I'm going to know the order the files were generated.

The great BASIC search continues. Atari BASIC as supplied with the ST leaves a lot to be desired. As a result of the complaints about the ST BASIC, several developers have released a version of BASIC for the ST.

Rumor even has it that Atari may scrap the current BASIC in favor of a version from England. I hope to corner Richard Frick and try to get some details, but I'm not going to hold my breath. In the meantime, I'll try and find a BASIC for the ST that allows easy interfacing to the BIOS, XBIOS and GEMDOS calls, and a simple assembly/machine language interface.

When a suitable BASIC turns up, I'll pass along the word. One of the reasons that BASIC on the ST seems to be lagging may be the early and wide availability of other high level programming languages. Another factor may be in the interface to the GEMDOS, BIOS and XBIOS calls. These system calls are most easily interfaced from C or Pascal.

The bottom line is this: the ST is the first home computer where BASIC has been fairly unimportant. This really has nothing to do with the ST, it's more a factor of the popularity of Pascal and C these days. (Even Forth and assembly language seem to be more popular than BASIC on the ST.)

Of course there is the age old problem of porting existing software. Most of the questions we have had on BASIC are from people that have favorite programs on other machines that were written in BASIC, and they would like to move these programs over to the ST. It seems that most of the new programs being written out there are in other languages.

Even if Atari comes out with a new BASIC that is closer to other BASIC's, I suspect that BASIC on the ST will remain in the background. The ST seems to have two groups of people using it, the turnkey operators that are happy to run off the shelf programs, and serious computer users that prefer to work in C or Pascal and who often add assembly language routines for increased efficiency.

It is a sad fact that the middle ground just does not exist on the ST as it has for machines of the past. It used to be that people would buy a few games and some utility programs and a word processing package, and play around with BASIC a little. As they played with BASIC more and more, they became better and better programmers and would often pick up a little machine language programming along the way.

The GEM interface on the ST looks very slick, but the chances of somebody writing a GEM application by playing around with ST BASIC are slim. The GEM package is very, very complex, and by the time most beginners get up to speed on it, they will have outgrown BASIC anyway.

I'd like to wrap this BASIC discussion up by pointing out that "Power Without the Price" is very true for turnkey operators, but for beginners playing with BASIC and trying to use the true power of the ST it is more like "Power beyond reach." Your best bet to use the GEM interface is to buy a package like Personal Pascal where a lot of the GEM interface work has been done for you. ●

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Starglider 3-D Combat Flight Simulation

Atari 520ST computer owners with a penchant for space action/combat/flight simulation games are in for a treat with Starglider from Firebird Licensees, Incorporated. Starglider is the latest title released in Firebird's Rainbird series of recreational software products for microcomputers. News of the Starglider release was announced by Marten G. Davies, president of Firebird's U.S. division.

Starglider puts the computer gamer in command of Novenia's last Airborne Ground Attack Vehicle. The player must employ cunning and skill to use the craft's limited weaponry and finite fuel supply to overcome the sophisticated strategies and superior fire power of the invading Ergon air and ground forces. These forces are led by Fleet Commander Hermann Krudd in the space-fleet's formidable, almost-invincible starship, the Starglider. Hair-raising maneuvers, breathtaking perspectives of the spacescape and incredibly realistic animation and sound effects make Starglider a truly new and noteworthy software offering for the Atari 520ST.

Starglider comes complete with game program disk, flight training manual, full-color A3 poster, handy keyguide and a 64-page novella which sets the stage for action. Starglider carries a suggested retail price of $44.95 and is available at better software and computer specialty stores everywhere.

Firebird Licensees, Incorporated is a wholly-owned software publishing subsidiary of British Telecommunications, PLC (U.K.). Firebird's United States division is headquartered in Waldwick, N.J. and markets an assortment of high-quality recreational software products for microcomputers.

More information may be obtained by contacting Firebird directly at P.O. Box 49, Ramsey, NJ 07446; (201) 444-5700. ●

XENIX® To AT&T UNIX System V Release 3

Microsoft Corporation recently announced that it has entered into a licensing agreement with AT&T for the UNIX® System V Release 3 operating system. This agreement allows Microsoft to upgrade its existing Microsoft® XENIX® customers with the latest developments in UNIX System technology, which have been made available by AT&T under the System V Release 3 license.

This agreement extends to all versions of Microsoft XENIX; and Microsoft will move rapidly toward release System V Release 3 versions of XENIX for the Intel 286 and 386 chips in conjunction with its OEM customers and development partners such as the Santa Cruz Operation. Existing OEM customers for these versions of XENIX include IBM, Compaq, Altos, Tandy and many other leading computer manufacturers. The installed base of XENIX systems is now over 175,000 units, which represents the majority of UNIX-derived systems installed to date. The UNIX System V Release 3-based version of XENIX will be fully backward compatible with existing versions of XENIX allowing OEM customers, application developers and end-users to retain the existing investments in XENIX in addition to exploiting the new features of UNIX System V Release 3.

Bill Gates, chairman of Microsoft Corporation, said: "We are committed to supporting the evolving UNIX System V standard for multi-user systems with the very best implementation of UNIX System technology for Intel processors. This agreement allows us to deliver that technology to our customers in a timely and cost-effective manner." Jack Scanlon, Group Vice President for Data Systems Division at AT&T said, "We are very pleased to have concluded this agreement with one of our best UNIX System customers. UNIX System V Release 3 represents a major step forward in technology, and Microsoft's commitment to deliver that technology to its customers is an aggressive timeframe will help consolidate the eminent position held by UNIX System V in today's market."

For further information contact Microsoft Corporation, 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717; 206-882-8080.

Mention that you read about it in *Computer Shopper*. ●

Graphics Editors For The Atari ST

by D. L. McLean

Xlent's first two software releases for the Atari ST hold true to the adage "Power Without the Price." Typesetter ST and Rubber Stamp ST, both written by Dennis Young and Len Dorfman, are very powerful and reasonably priced at $39.95 each.

Typesetter ST and Rubber Stamp ST follow Xlent's already large line of "printware" products for the 8-bit Atari computers. Their first releases for the ST can be best described as graphics editors rather than paint or drawing programs. Both support a wide range of dot-matrix printers.

Each program comes on a single 3.5 inch disk and is not copy protected, allowing you to run a back up copy and store the master.

Typesetter ST and Rubber Stamp ST each consist of six programs and utilities which support monochrome or color systems. The collection of programs and utilities are used to make exceptional graphic printouts.

Typesetter ST allows your printer to print with a resolution of 960x672 for monochrome systems and 640x672 for color. This is possible by dividing the graphic page into screen section referred to as cells. The monochrome mode supports nine cells while color has three. Considerable overlap exists between cells.

Rubber Stamp ST uses a similar method of handling the graphic page by having four equal size screens, called "sketch pads." The images created can be in one of the sketch pads or across multiple sketch pads. Each of the sketch pads are distinct entities. Great flexibility exists when working with graphic images. An entire screen can be reduced to fit into any one sketch pad or the inverse, a single sketch pad can be enlarged to fill the entire screen.

By entering a special mode called "Quick Rubber Mode" the sketch pads can be manipulated in just about anyway you can think of: moved, copied, reversed, shrunk, enlarged, flipped or mirrored, just to mention a few.

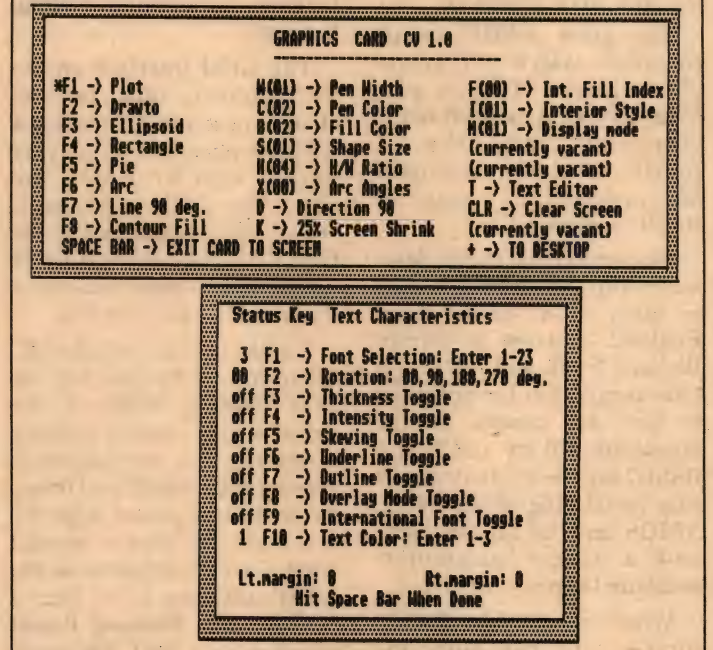
The graphic images created with Rubber Stamp ST can be printed with a resolution of 640x400 (from a monochrome system) or 640 x 200 (from a color system).

Both Typesetter ST and Rubber Stamp ST support a wide range of dot matrix printers such as Prowriter, NEC, Panasonic, Epson, or Epson compatible.

As with all ST programs, you start by selecting the appropriate icon from the GEM Desktop. The main menu is known as the Graphic Card. Selection of commands and their options are performed by depressing the appropriate function key or single character key. Obviously, this is not a GEM program.

After the command is selected, you'll be ready to enter the graphic page. This is done by depressing the space bar. Returning to the Graphic Card is as easy as depressing the right mouse button.

Rubber Stamp ST Main Menus



```
                        GRAPHICS  CARD  CV 1.0
                        ----------------------
*F1 -> Plot              W(01) -> Pen Width        F(00) -> Int. Fill Index
 F2 -> Drawto            C(02) -> Pen Color        I(01) -> Interior Style
 F3 -> Ellipsoid         B(02) -> Fill Color       M(01) -> Display mode
 F4 -> Rectangle         S(01) -> Shape Size       (currently vacant)
 F5 -> Pie               H(04) -> H/W Ratio        (currently vacant)
 F6 -> Arc               X(00) -> Arc Angles       T -> Text Editor
 F7 -> Line 90 deg.      D -> Direction 90         CLR -> Clear Screen
 F8 -> Contour Fill      K -> 25% Screen Shrink    (currently vacant)
 SPACE BAR -> EXIT CARD TO SCREEN                  + -> TO DESKTOP
```

```
Status Key  Text Characteristics

 3  F1  -> Font Selection: Enter 1-23
00  F2  -> Rotation: 00,90,180,270 deg.
off F3  -> Thickness Toggle
off F4  -> Intensity Toggle
off F5  -> Skewing Toggle
off F6  -> Underline Toggle
off F7  -> Outline Toggle
off F8  -> Overlay Mode Toggle
off F9  -> International Font Toggle
 1  F10 -> Text Color: Enter 1-3

 Lt.margin: 0          Rt.margin: 0
        Hit Space Bar When Done
```

Figure 1

The main menu, the Graphic Card, (see Figure 1) gives a good idea of the complexity and wide array of commands supported by both programs. Extensive use of function keys and single character commands makes working from the Graphic Page a breeze. I'll describe each of the commands and explain their use.

Plot [F1], allows freehand drawing with the mouse and supports options like color (limited to four: red, green, black and white) and width. It acts very much like an air brush—the slower you move, the thicker the paint, and the faster the mouse is moved the fewer drops of paint hit the screen.

DrawTo [F2], is used to create straight lines between two points. Pressing the left mouse button sets the starting point indicated by a small dot on the screen, and the cursor changes from an arrow to a cross-hair. Now you can place the other end point anywhere on the screen and complete the line by depressing the left mouse button again. Color and pen width are the options DrawTo supports.

Line 90 Degree allows placement of lines in any of the four 90 degree orientations, anywhere on the screen. The cursor arrow represents the beginning point of the line and the options are pen width (range 1-10), length of the line to be inserted (referred to as shape size) and direction 0, 90, 180 or 270 degrees.

Both programs have commands for generating geometric shapes. Provided are: Ellipsoids [F3], Rectangle [F4], Pie [F5], and Arc [F6]. The mouse is used to move the cursor arrow for placement of geometric shapes. The arrow represents the center for the ellipsoids, rectangle and arc, and the vertex for the pie shape.

Typesetter ST only supports a few options for the physical properties and colors of its geometric shapes while Rubber Stamp ST improves by adding additional features such as Fill Color, Interior Style and Display Mode.

Interior Style determines the interior makeup of the geometric shapes. They can be either hollow or solid or be filled with a pattern such as hatch or the Atari symbol.

The Display Mode lets you control what effects the geometric shapes have on the other images on your graphic page. It allows the shapes to

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CP/M For Atari ST

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DISK initializes blank formatted disks so they can be used by CP/M. TOSCPM is a program that copies files from a TOS formatted disk to a CP/M formatted disk.

Use TOSCPM to copy NSWP207.COM onto your pseudo disk from the distribution disk. This is a public domain program, New Sweep which makes file manipulations on CP/M systems very easy. Then use INIDSK to make a couple of CP/M disks. Use New Sweep to copy itself and TOSCPM and INIDSK to your newly made CP/M disks.

Now that you have a couple of prepared disks, use TOSCPM to copy the rest of the files from the distribution disk to your CP/M disks.

Two more programs that bear special mention are CPMTOS.COM and TOSDIR.COM. CPMTOS is the reverse of TOSCPM and lets you move files from your CP/M environment back into TOS. TOSDIR allows you to read a TOS disk directory from CP/M.

Of course you still haven't got anything really useful until you port some CP/M programs onto the system. This can be done several ways. CP/M files can be downloaded from many BBSs or commercial time-share systems.

I think however that the people who will benefit most from this emulation package are people like myself who already have a CP/M machine with a collection of software they don't want to give up just because they bought into an ST.

In my case for example I have a couple of programs on my Osborne that I really like. But after working on my ST with it's nice big 80 column color monitor it's really a pain to fire up the Osborne and work with it's tiny 52 column display. It didn't used to bother me but I guess I'm getting spoiled.

Anyway, to port files to the ST's CP/M emulator is a two step process. First you need to get them onto a normal TOS disk. Then use TOSCPM to move them onto the ST-CP/M disks.

I just got a new ST telecommunication program that makes the first part of this process a breeze. The program is CONNECT ($29.95 from SST Systems, 3456 Willis Dr., Titusville, Fl. 32796) CONNECT is a good program and I now use it as my primary telcom. package. But what makes it really outstanding for the job at hand is it's REMOTE feature.

What CONNECT allows you to do is control both sides of the file transfer process from a remote system. All I had to do was to run a Null modem cable between my Osborne and my ST. Bring up CONNECT on the ST and go into REMOTE.

Then bring up MODEM7 on the Osborne, from the Osborne I was able to tell CONNECT to change drives, receive files, send files, erase files, open or close folders, etc. It was great, instead of jumping back and forth between both systems for each file, I was able to sit at the Osborne and do it all.

For me this is a feature sent down from on high. Having three systems ST, Osborne, and PC-CLONE, I'm constantly porting files between machines. CONNECT makes my life much easier.

I've even started to use it as my private BBS. I'll leave my modem hooked up with auto answer on and leave my ST on running CONNECT in REMOTE mode. Then I can call home from work and port files from the PC at work to my ST and vice versa.

If you have or regularly use two computers you should look at this program. I know that now that I have gotten used to having it I don't want to give it up.

But back to the subject at hand, once you port files over to your ST-CP/M system how well do they work? So far I have to say they work great. I have not of course been able to try even a significant portion of the CP/M programs available. But the ones I have tried all seem to work.

There is a problem with screen control. CP/M doesn't have any standard or default terminal. Most programs that do a lot of screen manipulation have to be installed for the terminal you're using. And of course none of supplied terminal settings are for an Atari ST.

Wordstar for example looks really weird, and unless you take the time to install a new screen driver for the ST it's unusable. But in my personal opinion Wordstar started out unusable so I didn't spend a lot of time playing with it.

I had no trouble installing or running Turbo Pascal. And the same is true for MBASIC and ZORK1. All the BASIC and Pascal programs I ported over ran. Also the two public domain programs supplied on the distribution disk New Sweep and NULU worked fine.

In the documentation Atari says that the emulator is equivalent to a 2MHz CP/M system on average CP/M programs. I think that this is real close if not right on.

My Osborne is a 4MHz CPU with wait states for the slower dynamic RAM that they used. Granted the ST is slower but it's not running half the speed of the Osborne, so it seems to be running at least as fast as a 2MHz system with no wait states.

I only have minor complaints about the emulator package. The most significant complaint is that the package is not set up for single drive systems. It's not difficult to use a single drive system but it's difficult to set up on one.

A lot of this is due to everything being on one distribution disk when you first get it. The documentation makes it clear that Atari had intended to distribute it on two disks, one already formatted for CP/M with the CP/M programs already on it.

Another problem that again hurts people with only one drive is that the emulator doesn't like RAM disks. You can set up a RAM disk as a TOS disk and use TOSCPM and CPMTOS to move files from it to the CP/M disk. But I wasn't able to use the RAM disk as a CP/M disk.

Also the INIDSK program is a little flaky. I've got some blank formatted disks that TOS has no trouble with, but when I tried to run the INIDSK on them I got an error message "disk is not empty" and I couldn't use them with the emulator. Some other disks from the same manufacturer formatted on the same drive work just fine.

All and all this is a good package, with only minor problems. I don't know why Atari changed their plans and instead of marketing this package decided to release it into the public domain, but I am glad they did.

The emulator was developed by SoftDesign of Germany in conjunction with Atari, so I'm sure Atari spent some bucks to get it.

My feelings are that Atari's marketing people think that there would not be enough sales of the product to cover the cost of manufacturing and distribution. I don't know if this is right but it's my best guess.

Instead of letting it be a total waste, it seems that Atari decided to release the product as public domain. This, I think may turn out to be a smart move on their part. There are a lot of Apple II users in the world who run a Z80 coprocessor and CP/M on their Apples. Many of these people will be wanting to upgrade their systems sooner or later.

Normally I think that they would tend to go with a Macintosh, but if they can get an ST for half the price and port their existing CP/M software over, the ST becomes much more attractive. The same argument holds true for the thousands of people with other CP/M machines who would also like to upgrade to a newer more powerful machine.

I wouldn't have been at all reluctant to pay a reasonable price for this program as is. Now that Atari is willing to let me have it for free all I can say is thanks Atari! If you are even remotely interested in CP/M and have an ST, get yourself a copy of this package. ●

Spreadsheet Package For The ST-PowerPlan

Since VisiCalc, the computer has become an important planning tool. By using an electronic ledger, you can perform hundreds of calculations and "what-if" analyses quickly and reduce mounds of data into meaningful information. PowerPlan ST is such a tool for the fast-selling Atari ST computer.

As the name suggests, PowerPlan ST is a powerful analysis package featuring a large spreadsheet (65536 x 65536 cells), a built in calculator and an online notepad. And it also has integrated graphics. So data from the spreadsheet can be graphically summarized in pie, bar and line charts and displayed simultaneously.

PowerPlan ST is easy to use, since it uses the familiar GEM built into the ST. And PowerPlan ST can use multiple windows—up to seven. One window can display a part of the spreadsheet; a second window, a different part; and a third, a pie or bar chart of the data. And it works with either a monochrome or color monitor.

Software such as PowerPlan ST is just another reason that the Atari ST is one of the best buys in computers today. PowerPlan ST began shipping mid-November. The suggested retail price is $79.95.

For additional information contact Abacus Software, 2201 Kalamazoo S.E., P.O. Box 7211 Grand Rapids, MI 49510; (616) 241-5510, Telex 709 101.

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Degas Elite

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logically organized, more intuitive to use, and features a smoother, surer mouse interface than its predecessor.

Degas Elite allows you to draw in any graphics mode. You can draw freehand, or make use of tools that let you draw perfect lines, rectangles, circles, ellipses, polygons, boxes, discs, and rays. In addition to the airbrush offered in the original version, a "Stipple" selection has been added to Degas Elite, which is like an airbrush with a custom tip, which you can design. Another new feature, "Smear," allows you to semi-randomly mix-up the pixels within an area the size of your selected brush. It is handy for smoothing boundaries or smudging sharp contrasts into fuzzier ones.

"Mirror" allows you to draw symmetrically across up to six axes, while "Outline" draws an outline around whatever shape you specify. "Slowdraw" makes the mouse into a very precise instrument, while "Snap" allows you to align shapes to a grid. "Shadow" lets you offset another color from your main color in any of eight directions, with an offset of 1 to 16 pixels.

The "Fill" function of Degas Elite has been substantially refitted. In addition to the single-color fill patterns of the original program, pleasing and sophisticated multicolor fills are now available (in lo-res color mode). In addition, you can design your own. The fills are fast, and repeatable—you can always fill an area, even if it has been solid-filled before, as long as your fill pattern is of a contrasting color.

The palette and text functions have also been improved. Now colors can be moved from one paintbox to another, and "tweaking" between shades of a single color has been made much easier. Palettes alone are now loadable/savable, leaving the graphics screen intact. Conversely, images can be loaded, leaving the palette intact. Text fonts can be loaded as well, and text can be underlined, thickened, lightened, skewed (italicized), or outlined. Shadowed letters are possible, and can be used to dramatic 3-D effect.

Most impressive, however, are the new additions that now move Degas Elite from the realms of the "very good" to that of the "superlative."

"Magnify" expands an area of your drawing to about a third of the full-screen size so you can work on it in more detail. By pressing a function key, you can move from 3x to 12x magnification. At 12x magnification, each pixel is nearly the size of a dime. In the magnification mode, the top of the screen displays a palette, scrolling arrows, and a toggle for the level of zoom you would like. The left side of the screen shows the "real" size of your graphics, while the right side displays the magnified version.

You can draw in the magnify mode just as you would upon the regular drawing screen. Magnify gives you total control over every individual pixel on the screen of the Atari ST.

The concept of "Blocks" has been considerably expanded in Degas Elite, and offers a whole new range of capabilities. Pressing the [ESCape] key puts a crosshair on the screen, which can then be used to define a block. In this way graphics can be moved and copied. The "Stretch" command allows you to scale a block up and down vertically and horizontally. "Rotate" allows you to "turn" a shape to the angle you specify. Horizontal and vertical "Skewing" allows you to offset either the top and bottom or sides of a block. "Distort" lets you move each corner of a block to a different position on the screen and distort the image quite radically. You can even overlap sections of the block itself and "fold" the image upon itself.

In addition, individual blocks can be saved to and loaded from disk.

One of the most powerful additions to Degas Elite is the capability to provide color-cycling animation to graphics screens. "Animation" permits you to cycle a selection of colors in your palette automatically. If your imagery and palette are carefully orchestrated, the effect can be extremely effective. You can define up to four sets of animation palettes, and set individual speeds and "directions" for each.

"Cycle" is a drawing tool which uses the animation palette to define its colors. When you draw with a "Cycle" brush, the brushstroke will automatically cycle through the range of colors. This feature was once available only on graphics workstations costing thousands of dollars—and now literally shines on your Atari ST.

Perhaps most important, Degas Elite now supports multiple drawing or workscreens, depending on your memory configuration. A 520 ST will support four simultaneous screens, a 1040 will support up to eight. To select a screen to work in, you need only to click on a numbered box on the bottom right of the main menu.

Multiple screens give you the capability to work up a library of graphics "primitives" for use in creating more complex drawings. You can load a number of screens simultaneously and move graphics between them. The only limitation is that all workscreens operate under the palette of screen 1.

The disk options from Degas Elite are also greatly improved. "Set Drive" allows you to set the default drive (not path) from which to load and save files. You can load pictures from NEOChrome and Koala Pad formats, as well as Amiga .IFF format pictures (using Electronic Arts' file format). You can also move images within ST resolution modes—for example, monochrome to lo-res color or hi-res color, or vice versa. When you load a picture saved in a different resolution from the one you're using, the picture is translated line by line, and Degas Elite processes and adjusts the image to achieve the best possible rendition of color densities.

Degas Elite also features an automatic compression routine which reduces the size of a standard picture file from roughly 34K to anywhere between 10 and 24K. There are several reasons to use or not to use compression. Some word processors now allow you to include graphic files such as Degas pictures in them. They usually require an uncompressed file. Translation programs which allow you to turn Degas pictures into other format files require uncompressed pictures to translate properly.

On the other hand, you can fit many more compressed pictures on a single disk, and Degas can read them without modification. If you are putting together a slide show, for example, the compression feature of Degas can increase the scope of your presentation quite a bit. (An improved slide

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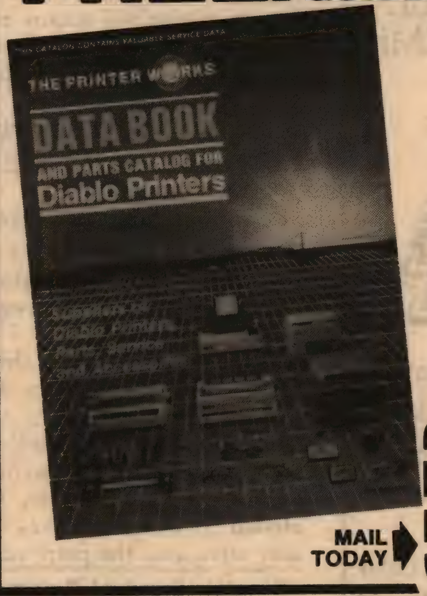

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Graphics Editor

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replace or "cover up" whatever is behind the new shape, or it can be transparent, allowing the background to show through the newly overlayed shape. XOR (negative image) and reverse transparent (opposite of transparent) offer more control over the geometric shapes.

Placing these shapes on the screen is simple. Clicking the left mouse button places the shape on the screen. If you hold the left mouse button down while dragging the arrow accross the screen a series of the shapes are deposited.

No graphic page is complete without text, and this is where Typesetter ST and Rubber Stamp ST shift to high gear. Text mode is entered by depressing "T" while at the Graphic Card. This toggles you to the text mode and displays the Text Characteristics Card. The space bar removes the menu from the screen and the [F1] key will call it up again.

From the Text Characteristics Card (see Figure 1) you can select from as many as 23 different fonts or one that you have created with the font editor in DEGAS. Most of the options are straightforward so I won't go into them in much detail, but I really enjoyed the rotation command, allowing me to specify the rotation or orientation of the text to be inserted on the screen.

Rotations of anything other than 0 degree causes the cursor to disappear from the screen making text entry difficult. As long as you position the cursor first, before changing the direction, text entry is trouble-free.

Typesetter ST allows additional sub menus. Loaded font [F2], used to select graphic font qualities. Font height, width, color and inverse or overlay modes are supported. Large grid [F4], and fine grid [F5] are used to position the cursor to a relative pixel position.

Left margin [F7] and right margin [F8] allow you to adjust the margins to suit your taste. Move to a new cell [F9], selects the appropriate cell for the text mode.

Disk I/O functions [F10] supports loading of full Typesetter ST pages, standard 32K screens (such as NEOchrome or DEGAS pictures), or 8K icons or sketch pads created with Rubber Stamp ST and external fonts. Saving your files to disk is also straightforward, but be sure you have plenty of room on your disk, as a full graphic page takes up about 80K of space!

Rubber Stamp ST also supports an even larger array of sub-menus in text mode than Typesetter ST. [F1] allows selection from one of the 23 available fonts. Text rotation [F2] is used to rotate the text on the screen in any 90 degree orientation. As in Typesetter ST the cursor is only visible while the rotation is 0 degrees.

Thickness toggle [F3], sets the text to a larger thickness while screen move [F4] flips or overlays sections of the screen vertically or horizontally. Screen rotation [F5] is similar but, will rotate any section of the screen in 90 degree increments.

[F6] displays a fine grid on the screen to help position the cursor. Again, like Typesetter ST, after positioning the cursor the grid needs to be turned off before any other action can take place. Margins are easily adjusted by [F7] for the left and [F8] for the right.

Rubber Stamp ST supports a wide array of printer selections [F9]. Selectable outputs are Full screen dumps, 15/16 x 3-1/2 inch label, 2 x 2-3/4 inch Rolodex card, 3 x 5 inch index card, 4 x 6 inch index card and free form.

Disk I/O function [F10], allow you to load or save the screen as either a sketch pad area or an entire screen. When loading or saving a sketch pad, the quadrant must be specified. External fonts can be loaded and so can screens from a converted NEOchrome or DEGAS picture.

It should be apparent that Typesetter ST as well as Rubber Stamp ST support many commands. To really get an appreciation for the programs you have to use them.

Four utility programs are provided in Typesetter ST and Rubber Stamp ST. With the utilities provided, DEGAS (Batteries Included), NEOchrome (Atari) and Snapshot (Michtron) files can be converted to a 32K Typesetter or Rubber Stamp ST screen format for use with Typesetter ST or Rubber Stamp ST.

LOWMED.PRG converts a low resolution screen to a medium resolution Typesetter ST or Rubber Stamp ST file. Xlent recommends the use of a .MMM file extender on converted files. LOWVER.PRG converts low resolution file to a high resolution file using an extender of .HHH. MEDVERT.PRG converts medium resolution files to high resolution files and also carries the .HHH extender. The last utility is an Epson JX-80 printer driver.

Typesetter ST and Rubber Stamp ST are fun to use and serve a useful purpose. Each program seems to complement the other and as a pair they give you a nice graphic editor for full graphic page printouts at a reasonable price.

This is not to say that the software is without problems. Numerous small bugs are present. Typesetter ST seemed to have more problems than did Rubber Stamp ST but, being the first release of the program they're no buggier than expected. Rubber Stamp ST seemed much cleaner and it is apparent from the additional features available, the product is maturing quite nicely.

Both manuals for the programs were written by Arthur Leyenberger and seemed to cover most of the material well. Even with the complexity and power of the programs, by following the manual a step at a time I was able to master them both.

Typesetter ST and Rubber Stamp ST are distributed by XLent Software, P.O. Box 5228, Springfield, VA 22158; (783) 644-8881. ●

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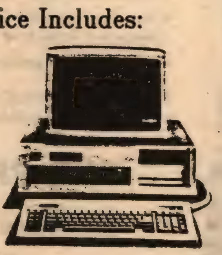

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QUANTITY DISCOUNT AVAILABLE

Degas Elite

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show program is included on the Degas Elite disk, along with a set of printer drivers, and a font editor.)

All commands except those on the pull-down menu bar can be activated from the keyboard. This is an excellent feature, and one we have come to expect from Batteries Included. It ensures that as the user advances, the point-and-click interface that initially made the product easy-to-learn does not itself later become a disadvantage. The user can move from point-and-click to selected keyboard commands at his own rate.

The documentation accompanying the package is clear, well-written, and well-organized. If I was to pick any nits, it would be to point out that its index can be a bit maddening—it points you to every occurrence of the word you seek, with no hint of where the "meat" will be found. One example: "Disk 1, 3, 4, 9, 14, 43-46, 51, 53-56, 59-62, 64, 66, 67, 69, 81." This makes for an impressive-looking index, but doesn't really help the user very much. (It is a frequent problem, now that indices are almost always compiled by computer.) The documentation is also perfect-bound, which means you will have to break its spine to get it to lay flat and open. Pages are coming loose from mine now, so please treat yours with more respect.

But it is the software that counts, and Degas Elite is probably the best piece of software to have appeared for the Atari ST to date. If you have Degas and use it regularly, you will want to upgrade. If you have held out on a paint program for the Atari, let it be known that time has come.

Tom Hudson, the author of Degas and Degas Elite, has scored once again—this time with a program that leaves absolutely nothing to be desired. Now if only he would get to work on an animation program of the same caliber...

Degas Elite retails for $79.95. It is *not* copy-protected. For more information, contact Batteries Included, 30 Mural St., Richmond Hill, Ontario, Canada LB4 1B5. (416) 881-9941. ●

Sinclair Survival Column

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may slice portions of it to suit your needs, such as placing some of this information in a separately created window onscreen which constantly displays the current information. (Next month I will show you how to accomplish this.) Using the function DATE (no $) will return the date as a floating point number which you may use to store dates and times in a more compact form.

To get the day of the week you would use the function DAY$ which will use the date information to compute and present the current day of the week.

When using ARCHIVE (database) you may want to create a form such as an invoice, purchase order, or any other form or report on which you require the time and date of its printing. Although ARCHIVE uses its own set of commands for this, you still must set the QL's clock upon powerup in this fashion before you load ACHIVE.

A final command relating to the clock functions is ADATE. ADATE is used to adjust the clock without going through the SDATE function. ADATE followed by a number of seconds (may be positive to set the clock ahead, or negative to set the clock back) will make fine adjustments. For example—ADATE 3600 will advance the clock by one hour while ADATE-60 will move the clock back one minute.

This is just our first look at the power of SuperBASIC which will continue on an ongoing basis. If you have a short program which can be used as a demonstration of some feature of the QL, QDOS, SuperBASIC or any other aspect of the computer's operation, send it to me in care of *Computer Shopper* and I will share the best ones. ●

Expanding Your H/Z

continued from page 123

ble motherboards, whose ever they are.

If you're running an H/Z-150, you can also do the modification another way. This slight variation is especially helpful, since it solves the timer interrupt error problems that occur when booting at higher speeds. (The error happens during a routine in the power-on ROM diagnostics.) With this modification, the machine starts at 4.77 Mhz and then automatically shifts up to high speed for normal operation, after the critical parts of the ROM diagnostics are passed. You can also shift CPU speed up or down anytime from software.

Giving Credit to Whom 'Tis Due...

Some of the ideas for the H/Z-150 version of this modification came from Robert Maskasky, who has worked out a similar mod for Dante Bencivengo's TurboPlus module. Robert's complete article on the TurboPlus modification, will appear in an upcoming issue of HUG's *REMARK* magazine (possibly even before this column is in print). He has given us permission to use part of his information for the update here.

The IBM-XT compatible part of the modification was inspired by Larry Fogg, who wrote about a similar project in the Aug.-Sept. '86 issue of *Micro Cornucopia*. Larry described a simple turbo modification using a second 8284 clock generator to establish turbo speed, like PC-Sprint, but using a chip piggybacking approach instead of board expansion. He not only gave complete instructions for the hardware mods in the article, he also presented a very nice TSR (terminate-but-stay-resident) software driver which uses the software speed switch (the program is also compatible with the PC-Sprint modification here).

Larry's program allows you to switch between low and high speeds by using an ALT-F9/ALT-F10 keystroke. You might want to get the original copy of the article for your information. You can order a back issue with the article (Number 31) for $3.00 from Micro Cornucopia (address at end of article). The article also includes a complete assembler listing of the speed selector program. You can also download the software from the Micro C BBS (number also at end of this article).

Theory of Modification

By now, you are probably wanting to know more about the modification, so we'll look at the theory of operation first. Then we'll step through the actual modification procedure. For reference, Figure 1 (page 123), a partial schematic of PC-Sprint showing the modifications. You may want to refer to it (I will). (You might also want to compare it to the full PC-Sprint schematic diagram that we published in the Sept. '86 issue, page 156, which is also available as a graphic printout file on the PC-Sprint disk.)

The IBM PC-XT Modification

We'll start the discussion by first looking at the XT version of this modification. The theory is really rather simple. The speed at which PC-Sprint runs (4.77 Mhz or 7.37 Mhz) is switch selectable. Notice in Figure 1, that SW1 controls the speed. When pin 11 is high (SW1 open), the computer runs at 4.77 Mhz. When pin 11 is low (SW1 closed), high speed is selected. Actually, what SW1 really controls is the voltage level that appears on pin 11 of U3 (an 8284). Since the voltage level at pin 11 of U3 varies from +5 to 0 volts it's a TTL level input. So, we can control the speed of PC-Sprint by driving pin 11 of U3 high or low with a TTL output, just as we do with SW1. (Fairly simple, so far.)

To implement the software switch, all we need to do is find a TTL level output that we can control through software. It would be nice if there was one already available on the CPU motherboard that's not being used somewhere else. That way, we don't have to add a new port just for a toggle switch on pin 11.

Fortunately, in the PC-XT, and most true XT-compatibles, there is such an output available: the 8255 PIO's Port B, Bit 3 (pin 21). In an XT, it's not connected to anything. Some XT Technical Reference Manuals state that Port B, bit 2 is the unused bit. But a careful perusal of the schematic diagrams, and XT motherboards, will show that bit 3 is actually the unused bit. (Larry Fogg points this out in his article, and I've confirmed it. IBM apparently made a boo-boo.)

By disconnecting the manual hardware switch, SW1, and reconnecting pin 11 of U3 to our software programmable switch line (Port B bit 3), we now have software control over CPU speed. You will also want to disconnect R5 and C3 from the circuit.

Inverting The Switch Line

There is only one minor problem with everything so far. Bit 3 of 8255 port B is always set high on power up. That means the CPU always will start out in slow gear, if we use it to drive the speed switch (remember, hi = slow). For machines that do long and tedious RAM testing on power up, the added turbo power won't help much.

On the other hand, with the addition of an inexpensive 74LS04 inverter chip, we can ensure that bit 3 is always low on power up. This means the machine will always default to high speed, until switched back to slow. This speeds up the POST (power on self test) RAM checking routines quite a bit.

Once these mods are made, we now have software control over PC-Sprint. By setting or clearing a bit in the PIA Port B, we can select high or low CPU speeds. (Specific software

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Expanding Your H/Z

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examples of how to do this will be discussed in a later section.)

Caution: This Will Only Work On A PC-XT Or True Compatible!!!

The normal PC1 and PC2 motherboards use Port B bit 3 for another purpose, so this modification will not work correctly. If you're not sure which type of board you have, you'll have to verify that the 8255's pin 21 is not connected to anything else. This may involve having to remove the motherboard and inspect it, or using a scope, logic probe, etc. (Fortunately, most PC-clones are close copies of the XT board, not the original PC board, so most clone users can use this mod as it stands.)

Theory Of The H/Z-150 Modification

The H/Z-150, being an XT compatible, can also be modified to work with PC-Sprint using the above instructions. The 8255 PIA is U230 on the H/Z-150 CPU board. Pin 21 is left unconnected and is available for use. But, there is another method available that is even better. It involves using one of Zenith's built-in diagnostic hardware features to automatically switch the CPU speed at boot up time.

If you are a regular reader of this column, you may also recall that the reason the H/Z-150 won't boot at the higher speed of CPU turbo boards is because of some difficulties in passing the timer interrupt (INT) portion of ROM diagnostics. Thanks to the clever thinking of Robert Maskasky, that problem is now eliminated.

Here's how it works: As an H/Z-150 series owner, you are probably aware of the row of diagnostic LEDs that are on the CPU board. As you will recall, they all light up on power up, and as ROM diagnostics progress, they turned off one by one as each section is checked and passed. This provides a convenient method by which we can tell when the INT routines are passed, because the INT LED on the CPU board will be turned off.

Those diagnostic LEDs are driven by a 74LS174 hex latch which is software addressable. Instead of using a PIA port line, the INT switch line is a better choice as the software selection switch for PC-Sprint. That way the CPU can start out at 4.77 Mhz, get through the INT diagnostics routine, and then be automatically switched to the higher turbo speed, when it's safe. Smart huh? Thanks Robert! (For more info. on what's going on here, refer back to the previous discussion in the IBM section.)

Inverting The Switch Line

Just as we needed to invert the switch line for the XT-compatible, we also need to invert the switch line used on the 74LS174 LED driver chip. That's because that line starts out low, and then switches high after the INT LED is turned off. If we used it raw, it would start the CPU at high speed (and fail ROM diagnostics). So, we also need the 74LS04 inverter. I didn't check real close, but there might even be an unused inverter somewhere on the Zenith CPU board. But the mods here recommend adding another chip since it's neither difficult or expensive.

Doing The Modification

By now, you should have a fairly good idea of what we're going to do. Again, Figure 1 shows the specific modifications that are needed. As you can see, it's really simple, but here's a step-by-step guide:

Warning

Doing this modification may void your warranty and may damage your computer. It should be done by persons who have experience soldering chips.

Neither Ted Drude or *Computer Shopper* magazine is responsible for any damage to your computer or peripherals caused by adding this modification.

1. First, break the trace on the PC-Sprint board that goes from U3 pin 11, to R5 and C3 (you can optionally just remove R5 and C3 from the PC-Sprint board and break the SW1 line).
2. Next, you'll need to add a new chip, a 74LS04 inverter, to the CPU board. Do this by piggybacking it on top of another 14 pin DIP chip. (Make sure to bend all the pins away from the bottom chip except for #1 and 14, which will be soldered to the lower chip.)
3. Next, connect a jumper (short as possible) from pin 2 on the 74LS04 to U3, pin 11.
4. The next step depends, of course, on whether you are working on an XT-compatible or an H/Z-150 (although the XT-version will work fine on the H/Z-150, it won't do the auto speed up). If you're working on an XT, solder another jumper from the 8255 PIO chip, pin 21 to the 74LS04, pin 1.

If you are doing the H/Z-150 mod, solder a jumper from pin 10, the 74LS174 Diagnostic LED latch (on older motherboards this is U200, on most newer ones it's U201), to the 74LS04 pin 1. The 74LS174 latch should be able to drive both the LED and the PC-Sprint 8284 chip, but you may find that you will have to remove the LED (CR2049), if there's not enough drive and sink capabilities.

Software Considerations

Just as the hardware mods are rather simple, so are the software drivers. In the XT-version, the 8255 Port B is addressed at physical port 061H. To switch to the higher speed, all we have to do is set bit 3 of port address 061h high (remember, we are inverting the line, so a high in this register now means a high CPU

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New Soft-sector

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very cheap prices, this may seem like a lot of money, but when you consider the engineering restrictions imposed by the original Heath design, and the fact that TMSI is custom-making the boards in relatively small quantities, it's probably not unreasonable. It's substantially cheaper than either the original Heath board or its main competitor, the very versatile and powerful (but also expensive) soft-sector controller card from CDR. (The CDR card, though, has an added feature in that it will support a mixed configuration of 8" and 5¼" drives. The TMSI card, like the original Heath H-37, can be configured to drive either 5¼" or 8" drives, but not both at the same time.)

In any case, both products give the H-89 user who has a lot of time and money invested in his system with existing files and software an option to upgrade while keeping compatibility with his old H-17 disks, something that he would lose if he simply scrapped his H-89 and went to a different CP/M or MS-DOS machine. For the user who has a big investment in HDOS files and software, and who can't readily convert to a newer CP/M machine, a card like this is about the only economical alternative to junking everything and starting over.

The TMSI Soft-sector Controller at a Glance

Product: H-37 compatible Soft-Sector Disk Controller card for the Heath/Zenith H/Z-89, 89A, 90, etc. family of computers.

Controller chip: WD 1797

Capacity: Four 5¼" soft-sector drives, in any combination of 48 T.P.I. and 96 T.P.I. (40 or 80 track) single- or double-sided. (Like the original H-37, the card can be easily modified to drive 8" soft-sector drives instead of 5¼", but not both at the same time; hardware changes have to be made on the board itself, not just a software patch.)

Power supply drain: About 200 ma. max.

Price: (As of Oct. '86) $249 for a complete upgrade package with the board, ROM's, cables, mounting hardware, etc. (the $249 package includes some H-89 upgrade parts, such as a new CPU monitor ROM, a power supply upgrade, and other parts which are not necessary for the soft-sector controller, but which were provided by Heath with its original H-37 kit. Many newer H-89s already have these parts installed, and won't need them.); $195 for a complete assembled and tested board. $50 for a bare board, manual, and the custom PAL chips needed to build a board. (Other ICs, sockets, cables, etc. not provided.)

Manufacturer: TMSI, Inc., 366 Cloverdale, Ann Arbor, MI 48105, 313-994-0784. ●

Truvel Brings Flexibility And Affordability To Digitizing Scanners: Introducing The Z-Comp Series

Truvel, a southern California-based designer and manufacturer of computer peripherals, announced the release of their Z-Comp Scanners—a line of digitizing scanners that offer the user high-quality images, fast scanning speed and composition flexibility. Available in three basic models, Z-Comp scanners and their associated PC/XT/AT interface boards with accompanying software drivers have the ability to scan a full 11" x 17" B-size drawing at a resolution of 300 dots per inch in less than 13 seconds—out-performing scanners costing more than twice as much.

Z-Comp scanners also include a special 3:1 zoom capability which can increase image resolution to 900 dots per inch on smaller portions of a large document, allowing users to selectively scan the portion they want to edit.

Additional features include a 256-level gray scale capability allowing for excellent duplication of multi-shade images; unique and efficient object illumination incorporating special electronics that compensate for variations in light level and pixel sensitivity of the CCD scanning element; and the ability to create halftones as photographs are scanned. Z-Comps interface with IBM PC/XT/ATs through Truvel's General Purpose Interface Card (GPIC) and software drivers which allow immediate integration with existing software editors (i.e. Dr. Halo and PC Paintbrush). Future releases of additional GPICs and drivers for other computers will be announced at a later date.

For additional information contact Truvel, 2808 Oregon Court, Suite K-2, Torrance, CA 90503; (213) 533-4971. ●

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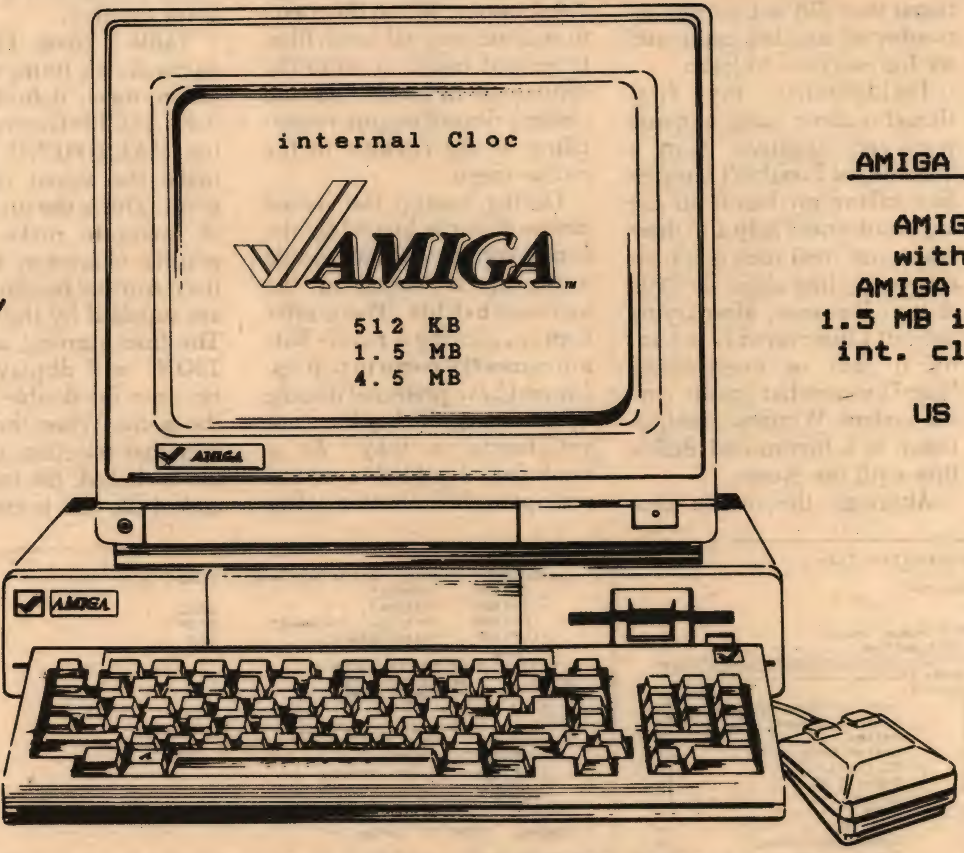

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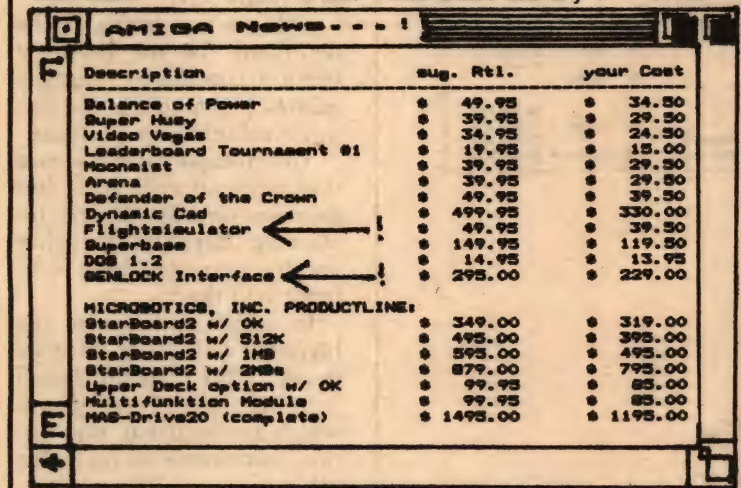

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Cutthroats	27.50	Sorcerer	27.50
Deadline	29.50	Spell Breaker	29.50
Dr.J & Larry Bird	29.50	Suspect	27.50
Enchanter	27.50	Super Huey	29.50
Flightsimulator	37.50	Suspended	29.50
Hacker	27.50	Temple of Apshai	29.50
Hacker II	32.50	Transylvania	27.50
Halley Project	27.50	Video Vegas	24.50
Hitchhikers Guide	27.50	Wishbringer	27.50
Leader Board	27.50	Witness	27.50
Little Computer People	32.50	Zork I	24.50
Marble Madness	33.50	Zork II	27.50
Mean 18 Golfsimulation	29.50	Zork III	27.50

Mouse Menus

continued from page 124

ability to erase files (!) and I panicked the time I was playing with the keys and saw a cursor moving through all the file names. I had visions of a disk wipe-out.

What I really wanted was a menu system that was easy for both of us to use and could be bypassed at will. Equally as important it had to be something that I, as a programming illiterate, could handle. Also, our daughter liked some of the action games and although too young for the keyboard could almost handle the joystick and mouse.

I recalled something in my Microsoft Mouse manual about menus. There I found a procedure for designing a custom menu that did not require an overlay of another command set for everyone to learn.

Incidentally, my first thoughts about using a mouse were very negative. Being a touch typist I couldn't imagine how taking my hands off the keyboard would help and there was some "real men don't eat quiche" feeling about the little critter. However, after trying one out I discovered how handy it was in overcoming Word's somewhat spastic cursor control. Window manipulation is a breeze and Reflex flies with the mouse.

Although the mouse program would allow me to build all the necessary commands right in the menu file, I decided instead to use the menu to activate external batch files. It seemed easier to write the commands in batch files and changes did not require recompiling as did changes in the mouse menu.

During bootup the mouse device driver is loaded by the config.sys file and the mouse menu file is loaded by the autoexec.bat file. Then, after bootup, clicking a mouse button causes the menu to pop up. I would have preferred it come up automatically but have not yet found a way. As a reminder, I added a screen prompt to click a button. After placing the cursor on the desired program name, another click starts the program running.

Table 1 (page 124) in the Appendix is a listing of the first mouse menu definition file I used. This file is compiled with the MAKE-MENU utility to make the actual menu program. This is the simplest type of menu to make. All the graphic characters to outline the menu and heading, or title, are supplied by the program. The lines starting with "OPTION" will display the text between the double quotes in the menu. When the cursor is over that selection and a button is clicked, the label at the end of the line is executed.

The labels are defined following the end (MEND) of the menu description. Label "P1," for example, types out "wp• CR□" which calls up the batch file wp.bat, listed in Table 2 (page 124). Since my wife and I use separate subdirectories for our document files with Word there is a menu selection for both of us.

Wp.bat sets the Turbo Lightning environment for the word processor, then starts Word with the proper subdirectory for the files. Upon exiting the word processor, the file help.bat is called up which reloads the menu. Every batch file called by the menu has "help" as the last entry. Table 3 (page 124) is a listing of help.bat.

However, not all programs exit in a manner that allows the batch file to continue. PC Paintbrush, for example, will terminate but not return to the batch file that called it. In this case, the menu is reloaded by typing, "help." You should make sure the PATH includes the subdirectory containing the help.bat file.

The instructions in the Mouse manual for making the menu, although not designed for the beginner were sufficient, along with some samples on disk, and a good bit of trial and error to guide me through the project. The menu system met its design goals with flying colors.

Just as the commercial software houses never end with version 1.0 of a program, I wound up with version 2 of my mouse menu system in only a couple of months.

The original menu was limited to 20 line items and I wanted a way to handle some choices after the original selection. For example, Word can be started with a particular file, the last edited document or a blank screen.

Table 4 is a listing of the definition file for the new menu. It contains two multiple column popup menus and five single column popup menus.

The multiple column menus take more effort to write but are more versatile. All text, including borders or other graphic characters have to be input into the file.

In addition, the area the highlight will cover must be shown. This is accomplished with the "select" commands which are similar to the "option" commands in the single column menu. The numbers after the label "select" are the line number, start column and length in columns of the cursor highlight; when selected with a button the label at the end will be executed. The size of the highlight can also effect the smoothness of operation. For example, the highlight for the

continued on page 254

Table 4 - Mouse Menu Definition File

For "new_menu.mnu"

```
BEGIN       run,run2  ;Buttons select which popup shows
newmenu:    popup,1,14      ;selected by left button
text "░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░"
text "░░░░░░░░░░░░░░░░░░░░░░░░┌───────────┐░░░░░░░░░░░░░░░░░░░░░░░░░░░░"
text " ┌──────────────────────┤ MAIN MENU ├──────────────────────────┐ "
text " │   CANCEL MENU             │     Archive Files to Disk        │ "
text " │   Microsoft Word - Vicki  │     Microsoft Word - Jack        │ "
text " │   Games                   │     Reflex                       │ "
text " │   Printmaster             │     Reflex Reports               │ "
text " │   PC Paintbrush           │     PC Tools                     │ "
text " │   Multiplan               │     Copy II PC                   │ "
text " │   Manage Your Money       │     Income Tax                   │ "
text " │   Microsoft Chart         │     CADD                         │ "
text " │   Sideways                │     Plot QBO                     │ "
text " │   Show Partner            │     Norton Utilities             │ "
text " │   Sidekick                │     Basic                        │ "
text " │                           │                                  │ "
text " ├──────────────────────────────────────────────────────────────┤ "
text " │            END SESSION - Park disk heads                     │ "
text " ├──────────────────────────────────────────────────────────────┤ "
text " │▓▓▓ To see this Menu again press a button or type: HELP ▓▓▓   │ "
text " └──────────────────────────────────────────────────────────────┘ "
select 4,5,25
select 5,5,25, VICKI
select 6,5,25, GAMES
select 7,5,25, PM
select 8,5,25, PCPB
select 9,5,25, MP
select 10,5,25,MYM
select 11,5,25,MSC
select 12,5,25,SIDE
select 13,5,25,SHOW
select 14,5,25,SKICK
select 16,5,59,PARK
select 4,40,24,ARK
select 5,40,24,JACK
select 6,40,24,DB
select 7,40,24,DB2
select 8,40,24,TOOL
select 9,40,24,C2
select 10,40,24,TAX
select 11,40,24,CAD
select 12,40,24,QBO
select 13,40,24,NU
select 14,40,24,BASIC
pend
;labels for newmenu
run:        EXECUTE newmenu      ;left button starts main menu
run2:       EXECUTE memresmenu   ;right button starts secondary menu
VICKI:      EXECUTE vickimnu     ;sub-menu started
GAMES:      EXECUTE gamemnu      ;sub-menu started
PM:         TYPE "PM" ENTER
PCPB:       TYPE "PB" ENTER
MP:         TYPE "MP" ENTER
MYM:        TYPE "MYM" ENTER
MSC:        TYPE "MSC" ENTER
SIDE:       TYPE "SIDE" ENTER
SHOW:       TYPE "SP" ENTER
SKICK:      EXECUTE skmnu        ;sub-menu started
PARK:       TYPE "SHIP" ENTER "Y"
ARK:        TYPE "ARCHIVE" ENTER
JACK:       EXECUTE jackmnu      ;sub-menu started
DB:         TYPE "DB" ENTER
DB2:        TYPE "DB2" ENTER
TOOL:       EXECUTE toolmnu      ;sub-menu started
C2:         TYPE "C2PC" ENTER
TAX:        TYPE "TAX" ENTER
CAD:        TYPE "AC" ENTER
QBO:        TYPE "MAP" ENTER
NU:         TYPE "NOR" ENTER
BASIC:      TYPE "BA" ENTER
;end newmenu labels
BEGIN       ;sub-menu for games
gamemnu:    MENU        "SELECT GAME",7,30
      OPTION      "CANCEL"
      OPTION      "BlackJack",G1
      OPTION      "States & Capitols",G2
      OPTION      "Checkers",G3
      OPTION      "Pong",G4
      OPTION      "Surprise",G5
      OPTION      "Kangaroo",G6
      OPTION      "Tron",G7
      OPTION      "Seawolf",G8
      OPTION      "Boxlaser",G9
      OPTION      "Peashooter",G10
      OPTION      "LIFE", G11
      OPTION      "Piano",G12
      MEND
G1:   TYPE "G1" ENTER
G2:   TYPE "G2" ENTER
G3:   TYPE "G3" ENTER
G4:   TYPE "G4" ENTER
G5:   TYPE "G5" ENTER
G6:   TYPE "G6" ENTER
G7:   TYPE "G7" ENTER
G8:   TYPE "G8" ENTER
G9:   TYPE "G9" ENTER
G10:  TYPE "G10" ENTER
G11:  TYPE "G11" ENTER
G12:  TYPE "G12" ENTER
BEGIN
vickimnu: MENU "SELECT DOCUMENT TO LOAD",6,30
      OPTION      "CANCEL"
      OPTION      "Letter",                 WPVL
      OPTION      "Previous Document",      WPVP
      OPTION      "Clean Slate",            WPVC
      MEND
WPVL:       TYPE "L" ENTER
WPVP:       TYPE "P" ENTER
WPVC:       TYPE "C" ENTER
```

```
BEGIN
jackmnu:          MENU "SELECT DOCUMENT TO LOAD", 6,30
      OPTION      "CANCEL"
      OPTION      "Letter",                 WPJL
      OPTION      "Previous Document",      WPJP
      OPTION      "Clean Slate",            WPJ
      MEND
WPJL:       TYPE "WP2L" ENTER
WPJP:       TYPE "WP2P" ENTER
WPJ:        TYPE "WP2" ENTER

BEGIN       ;sub-menu for pc-tools
toolmnu:          MENU "Make PCTOOLS Memory Resident?",6,30
      OPTION      "CANCEL"
      OPTION      "Yes", TOOL2
      OPTION      "No",  TOOLNR
      MEND
TOOL2:      EXECUTE keyrmnu      ;sub-menu started
TOOLNR:     TYPE "T" ENTER

BEGIN       ;second sub-menu for pc-tools
keyrmnu:  MENU "Which Keys to Activate PC Tools?",6,30
      OPTION      "CTRL - ESC", TOOLR
      OPTION      "CTRL - F1", TOOLR1
      OPTION      "CTRL - F2", TOOLR2
      OPTION      "CTRL - F3", TOOLR3
      OPTION      "CTRL - F4", TOOLR4
      OPTION      "CTRL - F5", TOOLR5
      OPTION      "CTRL - F6", TOOLR6
      OPTION      "CTRL - F7", TOOLR7
      OPTION      "CTRL - F8", TOOLR8
      OPTION      "CTRL - F9", TOOLR9
      OPTION      "CTRL - F10", TOOLR10
      OPTION      "CANCEL"
      MEND
 TOOLR:     TYPE "T R80" ENTER  ; batch file uses replaceable paramaters
 TOOLR1:    TYPE "T R80 F1" ENTER
 TOOLR2:    TYPE "T R80 F2" ENTER
 TOOLR3:    TYPE "T R80 F3" ENTER
 TOOLR4:    TYPE "T R80 F4" ENTER
 TOOLR5:    TYPE "T R80 F5" ENTER
 TOOLR6:    TYPE "T R80 F6" ENTER
 TOOLR7:    TYPE "T R80 F7" ENTER
 TOOLR8:    TYPE "T R80 F8" ENTER
 TOOLR9:    TYPE "T R80 F9" ENTER
 TOOLR10:   TYPE "T R80 F10" ENTER

 BEGIN      ;sub-menu for sidekick
 skmnu:     MENU "Kill Turbo Lightning?",6,30
       OPTION     "YES", KTL
       OPTION     "NO",  SKTL
       OPTION     "CANCEL"
       MEND
 KTL:       TYPE "KTL" ENTER
 SKTL:      TYPE "SK" ENTER

 BEGIN
 memresmenu:    popup,1,14      ;selected by right button
 text "░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░"
 text "░░░░░░ ┌─────────────────────────────────────────┐ ░░░░░░░░░░░░░░░░░░░░"
 text " ┌─────┤ INSTALL MEMORY RESIDENT PROGRAMS MENU   ├────────────────────┐ "
 text " │   CANCEL MENU                                                     │ "
 text " │                Turbo Lightning                                    │ "
 text " │                Turbo Lightning       +              Sidekick      │ "
 text " │                Turbo Lightning  + PC Tools  +  Sidekick           │ "
 text " │                                   PC Tools  +  Sidekick           │ "
 text " │                                                 Sidekick          │ "
 text " │                                   PC Tools                        │ "
 text " │   Smart Notes                                                     │ "
 text " │   Smart Notes              +                    Sidekick          │ "
 text " │   Smart Notes              +      PC Tools  +  Sidekick           │ "
 text " │   Smart Notes +  Turbo Lightning         +      Sidekick          │ "
 text " │   Smart Notes +  Turbo Lightning + PC Tools  +  Sidekick          │ "
 text " └───────────────────────────────────────────────────────────────────┘ "
 select 4,5,53
 select 5,5,53, TL
 select 6,5,53, TLSK
 select 7,5,53, TLPCTSK
 select 8,5,53, PCTSK
 select 9,5,53, SK
 select 10,5,53,PCT
 select 11,5,53,SN
 select 12,5,53,SNSK
 select 13,5,53,SNPCTSK
 select 14,5,53,SNTLSK
 select 15,5,53,SNTLPCTSK
 pend

 ;labels for memresmenu
 TL:        TYPE "RESIDE TL" ENTER
 TLSK:      TYPE "RESIDE TLSK" ENTER
 TLPCTSK:   TYPE "RESIDE TLPCTSK" ENTER
 PCTSK:     TYPE "RESIDE PCTSK" ENTER
 SK:        TYPE "RESIDE SK" ENTER
 PCT:       TYPE "RESIDE PCT" ENTER
 SN:        TYPE "RESIDE SN" ENTER
 SNSK:      TYPE "RESIDE SNSK" ENTER
 SNPCTSK:   TYPE "RESIDE SNPCTSK" ENTER
 SNTLSK:    TYPE "RESIDE SNTLSK" ENTER
 SNTLPCTSK: TYPE "RESIDE SNTLPCTSK" ENTER
 BEGIN
 arkmenu:         MENU "Archive Options",6,30
       OPTION     "CANCEL"
       OPTION     "Erase Backup Files", ARK1
       OPTION     "Archive Changed Files Only", ARK2
       OPTION     "Erase Backups & Archive Changed Files", ARK3
       OPTION     "Archive ALL Files", ARK4
       OPTION     "Erase Backups and Archive ALL Files", ARK5
       MEND
 ARK1:      TYPE "ARK 1" ENTER ; uses batch files "ark", "delbat",
 ARK2:      TYPE "ARK 2" ENTER ; "_delbat_", and "archive".
 ARK3:      TYPE "ARK 3" ENTER
 ARK4:      TYPE "ARK 4" ENTER
 ARK5:      TYPE "ARK 5" ENTER
```

Expanding Your H/Z

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speed). To slow back down to 4.77 Mhz, just set bit 3 low again.

The H/Z-150 LED latch is addressed at port 0C0H. The INT LED is controlled by bit 3 of the port. Other than the port address, the software control of the port is identical with the XT PIA version. (If you get Larry Fogg's program, it can be easily modified for this port address.)

Listing 1 (page 123) is a commented example of how to do the switching. You can even key in the lines to DEBUG and make two simple programs called FAST.COM and SLOW.COM, to do the switching for you. You can also check into Larry Fogg's RAM resident version.

Some Comments on Zenith's ROM BIOS

I've had a lot of readers write and ask me to spell out the details of the various Zenith ROM BIOS versions that have appeared over the years. One reason that I haven't written much on this topic is that there isn't much resource material to draw from. Zenith (unlike IBM (has never released the source code to their ROM BIOS, so any detailed analysis of the ROMs can only be made by studying hand disassembled listings. (And 32K of hand disassembled ML code can be one big PAIN to deal with!) But, I have made some small discoveries in my travels through the 150/158 BIOS chips, and I'm willing to share my limited knowledge with our readers.

Overview

First of all, Zenith's ROM BIOS is designed to be as compatible as possible with the IBM PC-XT ROM BIOS, without infringing on IBM's copyright. Basically, that means it supports the same BIOS interrupt calls as the PC-XT. While remaining very IBM compatible, it has several significant advantages over many other BIOS ROMs, especially the cheap clone chips from Taiwan or Korea.

For one thing, the Zenith has a lot of hardware diagnostic tests built right into their BIOS. These routines are almost as powerful as what some other manufacturers provide on their diagnostic disks. While Zenith still has a diagnostic disk available, the built-in routines can detect most hardware malfunctions without the need for a technician.

Another nice feature is that the Zenith MFM-150 machine language monitor that's always available. This is a nice tool for software debugging and analysis. It's almost like having an inexpensive version of a hardware debugger always available.

BIOS Versions and Release Dates

I'm personally familiar with four different versions of Zenith ROMs: versions 1.7A, 1.8A, 2.3B, and 2.5A. I know that there are probably a couple of other versions running around (perhaps 1.9 and 2.0), but I haven't worked with them. These versions are numbered sequentially, depending on when they were developed, but there appears to be some gaps, too. For instance, I've never heard of versions 2.1 or 2.2.

The BIOS chips contain a date within the code (just like IBM's) giving their release date. If you are running the original BIOS chips shipped with your machine, you can deduct the general era of it's manufacture by it's BIOS version date. You can easily tell which version of BIOS you are running, and/or it's release date.

One way to find the BIOS version is to boot up the system and break to the MFM monitor instead of DOS. This is simply done by holding down the ESCape key during an autoboot or doing a CTRL-ALT-INS keystroke, after the machine is already running. In either case, the MFM monitor will sign on, and you will see the version number printed in the sign-on message.

To find the BIOS date you'll have to use the dump command of the MFM monitor or DEBUG. Just use the dump command (D) to dump the addresses at F800:0000. You'll see a mess of hex numbers printed in lines, with the ASCII equivalents over on the right side of the screen. The ASCII characters on the first and second lines will spell out the BIOS date and the ROM version number. The information will be formatted as follows: 1) a date, 2) a copyright notice (ZDS CORP), and 3) the ROM version. I don't know the exact dates for all versions of BIOS, but Table 1 (page 123) summarizes the ones I have found.

Comparison Between Versions

There are usually a lot of questions about how the different versions of BIOS chips compare, and what the differences are between them. (This is where Zenith releasing the source code would be helpful!) Sometimes people even express concern about being "locked out" of some future software compatibility if they aren't using the latest version. This concern is usually unjustified. Again, I don't have all the answers in this area, but I do have some general feelings that I've developed in working with the different versions.

First of all, the earliest versions of the ROMs are numbered under 1.7. If you have one of those ROMs, you will probably want to upgrade to a new version, because they represent Zenith's first round of BIOS compatibility trials. They were very good for a first try and originally ran a high percentage of IBM software (claimed compatibility was over 90%), but there are some tests that they do fail. Overall, they are probably as PC-compatible as most of the current cheap Asian clone BIOS chips. (For example, they pass the obligatory Flight Simulator/Lotus 123 PC-clone test.)

The next two versions, 1.7 and 1.8A, were even more improved in PC-compatibility over the earlier ones. They also

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Mouse Menus

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last selection on the main menu was made larger than needed to cover just the text. This made it much easier to go from the columns above to this area.

Which multiple column menu appears is determined by which mouse button is pressed first. When the left mouse button is pressed the Main Menu will pop up. Or pressing the right button will cause the secondary menu to appear. The secondary menu is used to change the loading of memory resident programs.

Even with 640K of memory it is easy to run out of memory for your main program after loading too many handy resident programs. Some combinations work better than others, too. For example, Turbo Lightning is a natural for use with the word processor and Sidekick is handy for use with Reflex. But, with both loaded there is not enough room for Reflex and a large file. The secondary menu allows loading of the appropriate resident program; some common choices are also included on the Main Menu. I found this more flexible than including everything in the autoexec.bat file which is listed in Table 8 (page 124).

Some selections on the Main Menu cause a single column menu to pop up. For example, selecting Word causes the menu to appear that allows choosing which document, if any, to load. The Game selection has another menu that lists the games available on the hard disk for use.

The batch files that start Word also save and restore a copy of the file "MW.INI" for each user. It is this file that saves a record of the last document loaded, printer driver in use, directory for data and other options. Thus each user starts with their own options and not what the last user left behind. A sample of the batch files that handle this task is included in Table 5 (page 124).

Table 7 (page 124) is a sample of loading a game which is a program in BASIC.

Replaceable parameters are used in a batch file for loading PC Tools as a resident program and to change the activation key. Table 6 (page 124) is the batch file that uses the parameters typed by the labels "TOOLR*."

The hard disk and mouse menu has really made the computer "user friendly." No more searching for the disk to load DOS, then the RAM resident programs, then the application program. And then all the disks for the next application program. An afternoon with Word, Reflex, Turbo Lightning and PC Tools no longer creates a disaster zone of floppies and jackets. As a bonus, writing the menus was fun and informative. ●

Expanding Your H/Z

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represent more stable versions, and were probably used in the bulk of 150s shipped during 1983 and 1984. My Z-150, manufactured in late 1984, had version 1.8A ROMs and I ran it for almost two years, without any problems whatsoever. During that period, I ran all sorts of IBM-PC software, both commercial and public domain. It convinced me that Zenith's ROMs have a high degree of PC-compatibility. (I'm still using that machine, but it has been upgraded to later ROMs, even though it probably wsn't necessary.)

While all these early ROMs were good, some programs written specifically for the IBM-XT still had some problems running on the 150 series. There were a couple of IBM-PC specific programs from MicroSoft (namely WORD and CHART), that wouldn't run on the Z-150 (although Zenith sold special versions that ran fine). So, in ROM version 2.0, Zenith decided to solve those problems, and they did.

After version 2.0, version 2.3B appeared, and then 2.5A also showed up, about a year ago. In these versions of ROM, Zenith had something besides IBM compatibility to consider. They had the implementation of the hardware features of the new 158 series to deal with. That new hardware was supported (to the best of my knowledge) starting in version 2.3B. Version 2.5 is the latest version and appears to only be available in the 256K EPROM size for the H/Z-158 machines.

Besides trying to remain compatible with both the Z-150 and 158 hardware, it's supposed that these new versions also attempted to increase PC-compatibility. Some have commented that Zenith has tinkered too much with these ROMs, and that the earlier versions were just fine. But whether the changes they have were needed or not, in any case, the new versions don't appear to have any less PC-compatibility than older ones.

I hope to explore this topic further in future columns. Any readers who would like to contribute their knowledge on the subject are invited to do so. Stay warm till next month!

Reader Disks Still Available

Yes! Our three reader disks are still available! The PC-Sprint Turbo Board disk, Z-80 Emulator/V-20 chip disk, and the A86/D86 disk are all available for $5.00 (U.S. funds only) each. Postpaid in the US and Canada from: Drude Micro Services, P.O. Box 533, Cedar Falls, IA 50613.

Products Mentioned In This Column: Product: Back Issue of *Micro Cornucopia* (Aug./Sept. '86 31), Price: $3.00, Order From: Micro Cornucopia, P.O. Box 223, Bend, OR 97709; (503) 382-5060, (503) 382-7643 (BBS). ●

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The integrity of data is always important if the data is to be considered reliable. UNIX provides the capability of executing more than one process at a time. With this feature, a problem arises as to data integrity. If two or more processes are using shared memory or the same file then the operating system must synchronize their operations to prevent the data from being corrupted. For example, two processes are executing, process A and process B. Both processes read the value 1000 from a shared memory variable. Process B adds 200 to the 1000 and writes 1200 back out to the variable. Meanwhile, process A adds 500 to its 1000 and writes 1500 to the variable. The final value of the variable is 1500 which is not correct. Process B should have read the value 1000 and then "locked" the variable to prevent another process from updating it. After process B is finished updating the variable with 1200 then the variable is "unlocked." Process A is not allowed to update the variable until process B has "unlocked" it. Then process A reads in 1200 and adds 500 with a result of 1700. 1700 is the correct value. Process synchronization coordinates this type of resource sharing. It can get very complex when there are many processes executing in various sequences and conditions, all sharing a common resource.

Process Scheduling

In a multiprogramming, multiprocessing environment the objective is to maximize processor utilization. A system with just one processor can only execute one process at a time. To allow for more than one process to run requires splitting up the processor time among each process. Scheduling is the process for creating an execution queue. Scheduling also handles input/output functions and device queues. Depending on the size of a system, there may be more than one scheduler. Each scheduler would have varying levels of scheduling to handle different systems work loads. A process scheduler must always decide which process and in what order they should execute.

Deciding which process to schedule involves looking at scheduler performance criteria. This is based on the central processor unit (CPU) utilization, process throughput, turnaround time, waiting time, and/or response time. Time is money, so the CPU should be utilized as much as possible. Throughput is the number of processes or jobs completed in a period of time. Turnaround time is how long it takes a job to execute, from the time it was submitted to when execution has completed. Waiting time is the amount of time a job spends idle in a waiting queue. Response time is the period of time from when a job was submitted, to when it first produces a response. The design or efficiency of a scheduler depends on the criteria chosen for a particular system. A simple scheduler would allocate CPU time on a first-come-first-serve basis, whereas a more complex scheduler might have multiple queue levels, each using different performance critieria.

Process Swapping

In order for many users or jobs to share system memory, there must be some sort of memory management. Just as with process scheduling, each request is given a certain amount of time to perform its task in memory. When that period of time has elapsed, the entire task is "frozen" and pulled out of memory until it comes to the top of the queue again. This is process swapping. A process is moved into memory from a storage area, such as disk, and allowed to execute for a period of time. Then after a process has received its share of available CPU time, the process is swapped, including all variables and flags, back out to the storage area. The next process is swapped in and goes through the same procedure. As more processes and users start needing

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CPU time, the more the system will be loaded down. It takes time to transfer a process in/out of memory to/from a disk.

Process Termination

When a process has finished execution it will then terminate. The termination of a process may cause other processes to terminate. A parent process should have the capability to terminate its children. When a parent creates a new process, it should retain the identity of the newly created process. Then when a parent process is terminated, all of the children can be terminated along with it, by use of identities. Termination of a process may only involve that one process or it may directly affect the existence of others. The operating system must be able to determine which processes should be terminated to free up resources.

Input/Output System

The input/output system is a straight forward design. Every piece of hardware supported by the system appears like a file. Data is transferred to and from I/O devices as if they were actually files. To print a document, the document is written to the printer file. A process needs to get numerical data from disk so the process reads the data from the disk drive file. The same concept applies when accessing memory. A memory file is listed in the device directory.

File System

The major features of a UNIX file system include a hierarchical structure, dynamic file expansion, structureless files, file security, and file and device independence. Having a hierarchical structure, related files can be grouped together and manipulated as a group. The file system is flexible enough that files can grow as needed and the contents be interpreted in whatever way is appropriate. Files are grouped into directories in the same way as a file drawer in a file cabinet. The UNIX file system is tree-structured. At the root of the tree is the root directory. Branching out from the root directory are subdirectories. To access a file nested down several subdirectories a path name is used.

The operating system maintains the location of the file, the size, a link count which is the number of other names this file is refered to by, who owns the file, security information, file type, creation date, the last modification date, and the last time the file was accessed. All input/output devices are accessed as if they were regular storage files. They are treated as special files and are grouped together in a device directory.

There are many UNIX utilities which serve as file management tools. Tools for copying data from one file or device to another, working with directories, viewing file contents, renaming files and linking filenames to one common file. One main point to keep in mind is that UNIX file structures are not very rigid. The internal organization of files are treated as a sequence of bytes.

Shell

The shell is the interface between the user and the system. It is the UNIX system's command interpreter. Some of the features of the UNIX shell include interactive processing, background processing, input/output redirection, pipes and filters, wild-card matching, shell scripts, shell variables, and programming language constructs.

The shell operates in a dialogue fashion. It asks for a command from the user and then it carries it out. When the shell is ready for another command it displays the "$" which is the system prompt. The format of a command line is the command first followed by any arguments or options that the command may require. Most UNIX utilities perform one function, which is to take some data input, process it, and produce the results as output. Three standard files, an input file, an output file and an error file, are assigned when a user requests execution of a

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Stan Veit's History–Computer Camelot

I opened the Computer Mart of New York in February of 1976 although we had been incorporated since December 1975, I was very unsure of ever opening such a thing as a computer store in New York City and was still actively looking for a writing assignment that pleased me. Dede, my wife and I were on our way to Long Island on the expressway when we passed a store on the side of the highway. Suddenly she said, "Stan, go ahead and open the computer store." "What got into you all of a sudden," I replied? "I just saw a store selling Hang gliders." If that guy can sell hang gliders alongside the L.I.E., you can sell computers in Manhattan." That was it, the die was cast, we were in the computer business!

Least anybody think we were impulsive, I would like to point out that I knew as much about microcomputers as anyone, which was very little. I had read all there was to read about them and actually operated an IBM 5100 which was the first real personal computer. Little did I know that the IBM 5100 was as far from a micro as Boston was from Santa Clara.

Having made up your minds to boldly go into the computer store business, where only one other couple had ever gone, we packed our bags and drove to Florida for Christmas.

When we returned, Dede went back to teaching school to support us while I plunged into the computer store business, inventing it as I went along. I decide that I needed a good location in Manhattan for my store. Of course I did not have the rent for a good Manhattan location, but things were bad in New York at that time so I sought to sublet a location. Then I got a bright idea, on 32nd St. and 5th Ave. was a famous hobby department store called Polks. Here was seven stories of nothing but hobby material, everything from Barbi dolls to radio controlled model airplanes and locomotives that cost $1,000. If I could rent a little space in that store I would have a great location. Well, I went to see Mr. Polk and explained about hobby computers, which he had never heard of because I had just put the two words together for him alone. It worked, he rented me 500 square feet in his store for a reasonable fee. Later I found out that the magician who sold magic tricks there had just died and Polk was stuck for the rent. Well, we would perform magic of a different kind.

When we returned from Florida, I got a call from a representative of the Sphere Computer Co. whom I had called about becoming their New York dealer. The Sphere was the first real desktop computer. It had a built-in CRT and keyboard. It also looked like a computer and was several years ahead of its time. I gave them a check for $2,500 and bought a complete "factory built," Sphere plus five kits to build more of the same. I was thereby made the dealer for New York, New Jersey and so on. What an honor!

The computer I really wanted to sell was the Altair made by MITS. My friend Les Solomon called Ed Roberts and tried to get me the New York dealership, but Ed had given the entire East Coast to a man named Dick Brown who was starting a company called "The Computer Store." Dick asked me to come to Boston to talk with him. When I went he said, "We understand you are interested in going into the computer business in New York?" "No," I said, "I am going into the computer business and I want to find out if I am going to sell Altairs or not." Turned out that they wanted a fat percentage of the profits and all kinds of franchise fees. I was lucky and did not become an Altair dealer.

Instead of Altairs I became a dealer for IMSAI who were easy to do business with. All you had to do was send them $2500 and promise to buy $10,000 worth of computers in a year. I did it and they shipped me computer kits in time to open The Computer Mart of New York on a snowy Sunday in the middle of February, 1976. My stock consisted of five incomplete Spheres, five IMSAIs, some 19" video monitors, one used Teletype ASR 33 and a lot of books about computers and computer magazines. It was the computer magazines that kept us going until we started to sell computers. Virginia Londoner the lady who owned *BYTE*, shipped us loads of magazines and we sold them as fast as they came in. In fact we were the entire New York circulation of *BYTE!* Dave Ahl of *Creative Computing* also personally delivered our magazines and we sold a load of them for him.

In addition to the IMSAI computer kits we bought one Altair. When a customer came in and asked about these microcomputers, we told him everything we knew and then showed the Altair and IMSAI. "Which one do you think costs more?" Everybody picked the IMSAI with the red/white/blue lucite panel, the red and green lights and the big paddle switches. "No," we said, "This Altair costs more." They always bought the IMSAI. (Of course, we didn't have any Altairs, but we didn't have any IMSAIs either!)

The way you bought your IMSAI was to pay me one third down, in cash. Then I put you on the list. When the computer kits came in I called up as many people as I had computers for. They picked up their kits after paying the balance in cash. When I say kits I do not mean the kits you get today to assemble a PC-clone. Today all the parts are on the boards, or at the most you have to plug-in chips and install the parts in the cabinet. The IMSAI kit, like all others required you to solder in all the parts including the 100-pin connectors and all the resistors and capacitors. You really had to know what you were doing or you destroyed your investment.

I had a staff of skilled hardware hackers who would put your computer together for you for $300. They charged me $150. Since we only made $100 on a kit and we only got a few kits a week, we tried to sell as many "factory-builts" as we could. One of our star assemblers was a medical student who could solder as fast as he moved his hands, and never made a solder bridge. Others were the electronics staff of a big military installation who worked for me in their off-hours. They also repaired the butchered computer kits when possible. We had customers who bought a kit and tried to build it with a 500 watt solder gun. They soon melted the motherboard and came in to buy a "factory built" machine pledging us to never tell that they hadn't built it themselves.

The staff at Computer Mart of New York consisted of myself and one "full time" salesman David, who came in at 11AM, went to lunch at 12 noon and left at 4 PM. His one redeeming feature was that he would stay up all night, at home working on software, or figuring out how to interface two different pieces of computer gear. Dave could interface anything to a computer, I mean anything! I was never at a want for help though, if things got busy I just had the hangers-out wait on the customers. These were people who were so nuts about our little computers that they hung out in our store all day. Some were kids, some were retired people and some were business people who took extended lunch hours to hang out at the Computer Mart. This started to annoy Mr. Polk because we were interfering with the sale of his Barbi dolls. On weekends you couldn't get into the ground floor of Polks because of the mob of computer nuts hanging out at our counter. Something had to give and it was us. After all it was his store!

We moved to a big store on Madison Avenue and 30th St. with 7,000 sq. feet on three floors. In the basement we had our stockroom and our own shop for repair and burn-in of

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program. The input generally comes from the keyboard, and the output and errors are displayed on the screen.

Background processing handles executing programs as secondary processes. Some programs may be time-consuming tasks. Instead of allowing these tasks to prevent further command input until the task is complete, a user can request that the task be executed in the background or as a secondary process. This would then allow the user to enter further commands while the background process is running. More than one background request can be executed at one time. Therefore the UNIX system can work on several tasks at once without requiring a dedicated input device for each task.

Remembering that files and input/output devices are all treated the same, the shell provides the ability for a user to reassign the standard input and output files. Instead of having a user retype in a list of customer addresses everytime a mass mailing is to be sent out, the user can redirect the input from a customer address file to the program which generates mailing labels. The mailing label program does not need to be changed to accept input from a file. The shell handles where the data is coming from to the program. The same is true when the results of a program need to go to disk instead of the printer. The user instructs the shell to redirect the output to disk. All a program is designed to do is to accept input, process it, and output the results. It is not concerned with where the data originated from.

Pipes and filters provide the capability to pass data directly from one process to another by using just one command line instruction. They will be discussed further in the section, Pipes and Filters.

Users often need to perform file management operations on a group of files. The user could perform these tasks one at a time separately. The UNIX shell offers a function called wild-card matching which permits the user to apply group file manipulations by using a single command instead. If a series of files need to be deleted and they all have something in common in their filenames, such as the first three letters being identical, then wild-card matching can be used to match on the first three letters of the filename. All filenames which have the same first three letters will be deleted. There are variations as to how wild-card matching can be used. This was just a basic example to show how a group of files may be deleted by using a single command.

Shell scripts are files which contain a sequence of commands to be executed. They could also be considered batch files since they will run a batch of commands. All the facilities of the shell can be used with shell scripts. Shell scripts save the user from having to repeatedly enter the same sequence of commands. The shell script is executed by entering the name of the file. Shell variables can be used to make the shell script more flexible. The variables are nothing more than a string of characters which are substituted in the shell script file in place of the variable. Shell scripts also allow arguments to be passed, conditional statements, case selection, repetition, conditional branching, command substitution, and comment lines. The shell could stand on its own as a programming language. Utilities can be put together in a shell script to form a new function.

Pipes And Filters

Pipes and filters manipulate and pass data from one process to another in a single command line. Filters, as the name implies, alter data. A filter could be a sort routine or a query utility. Data is passed through the filter and changed.

Pipes pass data directly from one program or utility to another. A list of customers need to be sorted and transferred to a report generator. The list could first be sorted to a temporary file and then the

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Modula-2 Tables

Table 1.

Modula-2 delimiters.

;	Separate Modula-2 statements.
:	Separate variable name & TYPE, Separate CASE labels and CASE statements.
.	Decimal point, MODULE terminator, RECORD field selector, QUALIFIED identifier selector.
,	Separate identifiers, Separate ARRAY indexes.
^	(up arrow) POINTER dereferencing.
|	Delimiter for CASE and RECORD variants.
(	Start nested expression, Start parameters list, Start enumeration
)	End nested expression, End parameters list, End enumeration.
[	Start INDEX list, Start SUBRANGE, Start variable memory address, Start MODULE priority.
]	End INDEX list, End SUBRANGE, End variable memory address, End MODULE priority.
{	Start SET expression.
}	End SET expression.
(*	Start comment field.
*)	End comment field.
..	SUBRANGE specifier.

Table 2.

Modula-2 operators.

+	Addition, SET union.
-	Subtraction, SET difference.
*	Multiplication, SET intersection.
/	REAL division, Symmetrical SET difference.
DIV	INTEGER division.
MOD	Modulus (remainder of INTEGER division).
IN	SET membership.
:=	Assignment in executable instruction.
=	Equal (BOOLEAN), Assignment in CONSTANT declaration, Assignment in TYPE declaration.
<	Less than (BOOLEAN).
>	Greater than (BOOLEAN).
#	Not equal to (BOOLEAN).
<>	Not equal to (BOOLEAN).
<=	Less than or equal to (BOOLEAN).
=>	Greater than or equal (BOOLEAN).
&	BOOLEAN AND (Conjunction).
AND	BOOLEAN AND (Conjunction).
OR	BOOLEAN OR (Disjunction).
~	BOOLEAN Negation.
NOT	BOOLEAN Negation.

Table 3.

Standard Modula-2 Functions.

DEC(x)	Decrement the value "x" by one. The arguments are of the type CARDINAL, LONGCARD, INTEGER, LONGINT, CHAR, and enumeration.
DEC(x,n)	Decrements the value "x" by the value "n". The arguments are of the type CARDINAL, LONGCARD, INTEGER, LONGINT, CHAR, and enumeration.
DISPOSE(p)	Deallocates storage allotted to "p" where "p" is declared as POINTER TO T.
DISPOSE (p,t1,t2)	Deallocates storage allotted to tag fields t1, t2, ... in T where "p" is declared as POINTER TO T.
EXCL(s,i)	Excludes element i from SET s. Element i is a constant or variable expression of the base type s.
HALT	Terminates program.
INC(x)	Increments the value "x" by one. The arguments are of the type CARDINAL, LONGCARD, INTEGER, LONGINT, CHAR, and enumeration.
INC(x,n)	Increments the value "x" by the value "n". The arguments are of the type CARDINAL, LONGCARD, INTEGER, LONGINT, CHAR, and enumeration.
INCL(s,i)	Includes element i into SET s. Element i is a constant or variable expression of the base type s.
NEW(p)	Obtains storage for p where p is declared as POINTER TO T.
NEW (p,t1,t2)	
ABS(x)	Returns the absolute value of x. The argument type may be INTEGER, LONGINT, REAL, or LONGREAL. The result returned is of the same type passed to the procedure.
CAP(ch)	Returns the upper-case equivalent of the lower-case character "ch". Upper-case and nonalphabetic are returned unchanged.
CHR(x)	Returns the character equivalent of the CARDINAL value "x". The argument types are CARDINAL or LONGCARD.
FLOAT(X)	Converts CARDINAL or LONGCARD "x" to a REAL value.
HIGH(a)	Returns the upper bound of the first dimension of ARRAY "a". The value returned is of the type CARDINAL.
MAX(t)	Returns the maximum value of the type "t". The arguments allowed are CARDINAL, LONGCARD, INTEGER, LONGINT, REAL, LONGREAL, CHAR, and enumeration. The returned value is of the same type as the argument.
MIN(t)	Returns the minimum value of the type "t". The arguments allowed are CARDINAL, LONGCARD, INTEGER, LONGINT, REAL, LONGREAL, CHAR, and enumeration. The returned value is of the same type as the argument.
ODD(x)	Returns TRUE if "x" is odd. Returns FALSE if not. The arguments allowed are CARDINAL, LONGCARD, INTEGER, and LONGINT. The value returned is of the type BOOLEAN.
ORD(x)	Returns the ordinal value of "x". (0 origin). The arguments allowed are CARDINAL, LONGCARD, INTEGER, LONGINT, CHAR, and enumeration. The value returned is of the type CARDINAL.
TRUNC(x)	Truncates "x" to its integral part. The arguments allowed are REAL, LONGREAL. The value returned is of the type CARDINAL.
VAL(T,x)	Returns the value with ordinal number "x" and type "T". "T" is CARDINAL, LONGCARD, INTEGER, LONGINT, CHAR, or enumeration. "x" is of the type CARDINAL. The value returned is of the type specified in "T".

Table 4.
Standard Procedures

Obtains storage for tag fields t1, t2, ... in T where p is declared as POINTER TO T.

Modula-2
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CASE statement produces the same net effect as a certain class of IF statements.

EXAMPLE:

```
CASE expression OF
   case-1 : statement-1 |
   case-2 : statement-2 |
   case-3 : statement-3 |
   .....
   case-n : statement-n;
ELSE
   statement;
END;
```

where case-1 thru case-n represent Case Labels. Case labels must be constants or constant expressions. They may appear individually or in a list. Case labels may also be Boolean constants. The vertical bar, |, separates the statements for each case.

The ELSE clause is optional. It is included when there is a statement that needs to be performed when no match of the expression occurs. The CASE statement offers the advantage of being less wordy and more readable than the IF statement, but lacks flexibility, because CASE labels can not be Boolean expressions.

Looping Statements

Most of the power of a computer stems from it's capability to repeat tasks over and over. Modula-2 has a rich assortment of instructions for looping, or performing repetitive tasks. This assortment of looping instructions allows testing for an loop exit condition at the beginning, middle, end, or looping endlessly.

The REPEAT instruction allows one to execute a loop until the exit condition is met and takes the form:

```
REPEAT
     statement sequence
UNTIL expression;
```

where "statement sequence" is the loop body and is executed repetitively until the exit condition is met. The exit condition is tested after each execution of the loop body. This type of loop always executes the loop body at least one time.

The WHILE loop instruction tests the exit condition prior to executing the loop body and takes the form:

```
WHILE expression DO
          statement sequence
END;
```

where expression is the loop exit condition to be tested. Overall, the WHILE statement is used more often than the REPEAT statement because it allows for the possibility that the loop may not be executed at all.

In situations where a loop is needed to repeat a statement sequence with a progression of values, the FOR statement fills the bill very nicely. The for statement takes the form:

```
FOR control := expression-1
               expression-2
               constant DO
     statement sequence;
END;
```

where expression-1 specifies the starting value; expression-2, the limit; and constant, the increment or decrement value. Constant must be of the type CARDINAL or INTEGER. A positive value signifies an increment; a negative value, a decrement. If the constant is not specified, it is assumed to be an increment of 1. If the control variable is numeric, it must be of the type CARDINAL or INTEGER. Furthermore, expression-1 and expression-2 must be compatible with the control variable. REAL variables are illegal.

There arises the situation where a loop is required to execute a statement sequence over and over continuously and may or may not require an exit condition! Take, for example, the operating system in a computer. Once the computer is initialized the operating system is constantly awaiting your command or executing a program. The underlying concept is that the operating system is the lowest level of operation and it is running in an endless loop.

Modula-2 has a loop instruction which allows you to place statements inside an endless loop. Optionally, with the inclusion of an EXIT statement, you can exit the loop from anywhere within the statement sequence. The loop instruction's name is LOOP and it takes the form:

```
LOOP
   statement-1;
   statement-2;(optional EXIT test)
   statement-3;(located anywhere)
   .....       ;(within statements)
   statement-n;
END;
```

where statement-1 thru statement-n are the statement sequences to be repeated. Optionally a test can be made anywhere within the body of the statement sequence and an EXIT performed if the test condition is met.

By now you should have a general idea about the statements used in Modula-2 to implement conditional branching and loops. The discussion on statements in Modula-2 should have given you a feel for the way statements are implemented. Time to move on to

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bigger and better things.

Procedures in Modula-2

A procedure performs the same function in Modula-2 as a subroutine does in BASIC, but insulates the local variables from the rest of the program. The best way to describe a procedure is as a collection of instructions used to perform a particular action.

Besides containing commonly referenced routines, procedures serve as the building blocks of programs. To construct a procedure in Modula-2 you have to declare a procedure. (Have you noticed that there are a lot of declarations required in the language ???). A procedure declaration consists of a Procedure Heading and a Procedure Body.

The Heading includes the procedure identifier and Formal Parameters. The Body encompasses the local declarations and statements. The Formal parameters serve as place holders for the actual parameters that are passed by the statement calling the procedure.

Procedure parameters fall into two classes, Variable and Value parameters. If the parameter in the heading is preceded by the keyword VAR then the parameter is a variable type, otherwise, the parameter is called a value parameter and the procedure.

Variable parameters allow the procedure to modify the contents of the actual parameter in the calling statement. Procedures that use value parameters just receive a copy of the actual parameter passed by the calling statement. Procedures may work on the contents received through a value parameter without altering the contents of the original parameter. Both variable and value parameters are allowed in the same procedure heading, separated by a comma.

The TYPE of the actual parameters passed by the calling statement and the formal parameters in the procedure heading must agree. Specifically, the types of variable parameters must be identical; the value parameter types only need to be assignment-compatible. A formal parameter may be an Open ARRAY parameter, which is an array with no explicit upper index.

Procedures belong to one of two categories: Proper procedures or Function procedures. Function procedures have an unstructured result type and relay the result to the calling statement through a RETURN statement in the body of the procedure. Proper procedures do not have result

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report generator could read the temporary file for its report. By using pipe facilities, the temporary file could be eliminated. The data would directly pass through the sort routine to the report generator to the printer, all with a single command line. This provides a way to easily process data, by pipelining several utilities, without having to design a new program.

Multi-tasking

Multi-tasking provides the UNIX user with the capability to execute more than one task at a time or allow several other users to use the system also. Each task is given a certain amount of CPU time to run. Once that time is up, another task is given time to do some of its processing. A user may wish to have a program compiling in the background while updating the programs documentation at the same time. When the program finishes compiling, it will prompt the user. Printing a long document file would keep the user from using the terminal unless that process is told to execute in the background. Background processing was discussed in a previous section, The Shell. Multi-tasking gives the user more efficient use of time and resources.

Summary

The UNIX system was designed to make software development an easier job. What turned out was a system that not only serves the needs of individual users but is, for the most part, universal and portable. UNIX is not machine dependent. The operating system's commands are the same no matter whether a user is logged onto a mainframe or isolated in an area with a microcomputer running UNIX. Since UNIX is licensed by AT&T, the extra costs involved from royalty payments makes it undesireable for other vendors to modify UNIX. Instead they design their own system to include their modifications. UNIX then starts to lose its original intention of being universal. UNIX and its look-alikes need to have a standard to abide by.

The ability to run more than one process at a time allows more efficient use of CPU time and reduces time-share costs. The complexity of scheduling and synchronization algorithms determines the type of system performance that can be realized. Multi-tasking provides an efficient way to utilize all the resources. UNIX makes the best use of time for everyone.

The UNIX file system is easy to understand being that all files and input/output devices are all treated the same. Sending data to a printer is the same as sending data to a file. File structures are flexible. As the space is needed, file size will grow dynamically. There is no defined structure other than that all information is stored in a byte format. The data may be accessed in a number of different ways. Files are arranged in a heirarchical manner, and can be managed as a group. There are also various levels of file security to limit user access.

Overall, the UNIX operating system is very powerful. The trend seems to be towards UNIX. ●

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Toshiba's PageLaser 12 50% Faster Than Most

Toshiba has recently announced the PageLaser 12, which prints 12 pages-per-minute, 50 percent faster than most laser printers used with personal computers.

Priced at $3499, PageLaser 12 is Toshiba's entry in the laser printer market and is the first high-speed laser printer from a major PC printer manufacturer. Its extended product life of 600,000 pages is six times longer than the standard laser printers. It offers high-resolution text at 300 x 300 dots-per-inch on a full page, and a high duty cycle of 10,000 pages per month.

End-user replaceable, long-lasting consumables (toner, developer and drum) contribute to PageLaser 12's low maintenance costs and come included with the printer.

PageLaser 12 works with IBM-compatible microcomputers and most popular software packages. It has resident emulation of the IBM Graphics Printer, Diablo 630, Qume Sprint 11 and Toshiba's P351 3-in-one 24-pin dot matrix printer. An optional cartridge provides Hewlett Packard LaserJet 500 Plus emulation.

The printer's 16-digit front panel displays operating instructions and error messages in written form, not in flashing numbers found on other laser printers. Printer configurations also can be altered by using the front panel menu.

Standard with PageLaser 12 are a parallel-serial interface and 512KB of memory. An optional 1.5MB of additional memory provides for faster overall print speed and enhances other advanced features.

Also standard are three resident font (prestige elite, courier 10 and line printer), three font cartridge slots and downloadable font capability. All fonts can be portrait or landscape, bold, italics, reverse image (dark background) or halftone and can have half-height, double size and width characteristics. The end-user can change the fonts by accessing the font control panel or the application software package.

PageLaser 12 will be offered with a 250-sheet capacity input bin, a correct order-stacking output bin that holds 250 sheets and a manual single sheet-feeder. A sheetfeeder with two 250-sheet paper cassettes, an envelope feeder and a collator will be available as options in the future. All cassettes hold letter or legal size paper which can vary in width from 5.5" x 8.5".

For additional information contact Toshiba America Inc., 2441 Michelle Drive, Tustin, CA 92680; (714) 730-5000. ●

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types, instead the results are returned through the variable parameters.

Calling a Procedure

A procedure call consists of a procedure identifier or procedure variable identifier, optionally followed by a list of parameters in parentheses. The lack of parentheses or empty parentheses indicate a procedure that has no parameters. The exception is the function procedure, which requires parentheses even if there are no parameters to be passed. The parentheses are required to inform the compiler that there is a result returned from the function procedure.

The following example illustrates how procedures are called by a statement.

```
x := Sin(y);
```

This statement is saying x is assigned the result returned from the function procedure Sin. The variable y is the variable we are interested in finding the Sin value of. The above is an example of a function procedure.

Another example of calling a procedure is:

```
WriteLn;
```

This statement sends a carriage return/line feed to the output device. Notice there are no parameters passed or parentheses. WriteLn is an example of a proper procedure.

Standard Functions & Procedures

Modula-2 has functions and procedures that are integral to the language and need not be imported from libraries or written by the programmer. Table 3 is a list of the function procedures. Table 4 contains a list of the standard procedures.

As you can see there is a large number of built-in functions in the language. Any other functions must be "IMPORTED" from a library or written.

Low Level Facilities

We have now reached the point in the discussion of Modula-2 where the similarities to Pascal disappear. Modula-2 allows you the ability to dive right down to the hardware level. This gives the programmer a way to write device handlers, communications handlers, memory mapped input/output and other applications that defy expression in most high-level languages.

To operate at the lowest levels of the hardware, Modula-2 provides low level facilities which are divided into three categories:

1. Type-Transfer-Functions that get around the rigorous type checking by the compiler.
2. Declaration of variables at Absolute Memory Locations.
3. Types and procedures of module SYSTEM for determining the machine level representation of variables and data manipulation at the machine level.

Type-Transfer-Functions

Type-Transfer-Functions allow you the ability to transfer the variable contents of one type to a variable of a different type. Along with the easing of the type rules, however, comes less protection from programming errors. The portability of programs from one "host"computer to another is also reduced as the internal representation of data is usually machine-dependent.

Type-Transfer-Functions DO NOT involve any actual computations. These functions merely "relax" type checking and transfer the internal representation of a variable. One MUST know the internal format of variables on the "host" computer in order to use these functions effectively.

Type-Transfer-Functions essentially convert variables from one type to another. The functions are expressed by writing the type name with the variable.

```
EXAMPLE:
  VAR
      a : BOOLEAN;
    ch : CHAR;
  BEGIN
    a := BOOLEAN(ch);
```

In the above example the variable "a" is declared as a BOOLEAN type (remember...BOOLEAN types are TRUE or FALSE). The variable "ch" is declared as a CHAR type. Normally you can not assign a CHAR type to a BOOLEAN type without the compiler generating a type mismatch error.

Using the type transfer function circumvents the problem by relaxing the type checking of the compiler. By writing BOOLEAN(ch) you are telling the compiler to transfer the contents of CHAR type "ch" to the BOOLEAN type "a" without checking to insure the types are compatible.

Absolute Memory Locations

Declaring variables at absolute memory locations has particular application in memory-mapped computer systems. These systems usually reserve locations in memory for device I/O, screen buffer, interrupt vectors, and file-control blocks. To place a variable at a specific memory location, include the location in brackets after the identifier name.

```
                EXAMPLE:
VAR
PrinterStatus[9000H] : CARDINAL;
```

where 9000H is the hexadecimal location in the "host" computer's memory map that is defined as the printer's status port.

SYSTEM Module

The third category of the low-level facilities is made up of types and procedures con-

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tained in the module SYSTEM. SYSTEM is imported the same as any other library module but is not a library module itself. SYSTEM is actually an integral part of the compiler.

SYSTEM Types

SYSTEM contains the types WORD and ADDRESS. Word is generally used in procedures that operate on arguments of different types. Formal procedure parameters of type WORD are type-compatible with any formal parameters that occupies one word of storage.

The only operator that applies to WORD variables is assignment and WORD variables are incompatible with all other types, with the exception of parameter lists. The incompatibility limitation does not apply to open array parameters of the base type WORD. Open arrays of WORD are compatible with all types, including RECORDS and SETS. Any variable can be interpreted as an array of words.

The SYSTEM type ADDRESS is used to declare a variable as a CARDINAL compatible pointer variable that may be used in arithmetic operations. ADDRESS is defined as the type POINTER TO WORD.

SYSTEM Procedures

For data manipulation at the machine level, module SYSTEM has three procedures, named ADR, SIZE, and TSIZE.

ADR(x) returns the absolute memory location of the variable denoted as "x." The returned value is of the type ADDRESS.

SIZE(x) returns the number of storage units assigned to the variable denoted as "x." The returned value is of the type CARDINAL. If the parameter x contains a RECORD variant, the maximum possible record size is returned. SIZE does not accept open arrays as a parameter.

TSIZE(x) returns the number of storage units assigned to type T. (Remember: T specifies the type of a POINTER variable.) The returned value is of the type CARDINAL.

TSIZE works the same as SIZE does on RECORD variants with one minor difference. Tag field constants may be optionally specified to select a particular variant. If the tag constants are missing or only partially specified, the remaining variant with the maximum size is returned.

Co-routines in Modula-2

Modula-2 was designed to allow writing operating systems, including co-routines for the expression of concurrent activities, in a structured high-level language. Co-routines are procedures whose execution is triggered by an explicit transfer of control or by an event such as a hardware interrupt. A co-routine usually suspends its execution by transferring control to another procedure.

The main difference between a co-routine and a procedure is in the manner the co-routine is re-invoked. Procedures always start execution at the beginning but co-routines resume execution at the instruction following the point of suspension!

There are three steps involved in setting up a procedure as a co-routine. First, the procedure heading and body are declared as usual. Second, the procedure is designated as a process through the SYSTEM procedure NEWPROCESS. (In Modula-2 a process and co-routine are one and the same.) Finally, control is passed to the co-routine through the SYSTEM procedure TRANSFER.

The SYSTEM procedure NEWPROCESS sets up the co-routines "workspace" in memory for storing such things as the co-routines local variables, procedure-call information, and suspended execution state. The size of this "workspace" is determined by adding the procedure's data size to the data sizes of any called procedures, plus allowances for procedure-call linkages.

The SYSTEM procedure TRANSFER transfers control between processes in the following manner. First, TRANSFER suspends the execution of the current process. Second, it establishes the process identified in a parameter value passed to TRANSFER as the next process. Third, it saves the execution state of the currently suspended process. Finally, it resumes execution of the new process. If anyone is interested, the name of this mechanism is "Context Switching."

The transfer operation discussed so far only covers situations under the programmer's control. Modula-2 was designed to write operating systems, and operating systems MUST be able to handle external or internal events (interrupts). In module SYSTEM there is a procedure that allows for such responses. This procedure is called IOTRANSFER.

IOTRANSFER closely resembles the procedure TRANSFER in that IOTRANSFER suspends the current process and activates the new process. The next interrupt, however, causes an unscheduled transfer back to the original process. The method for keeping unscheduled transfers from occurring is by declaring module priorities. Module priorities will be discussed in the next section.

There is one other procedure contained in the module SYSTEM that is used in "Context Switching." The name of this procedure is LISTEN. LISTEN, when placed within a module that has been assigned a priority level, temporarily lowers the priority of the module to zero. If there are any pending interrupts requiring service, the procedures that perform the service may do so at this point.

LOCAL Modules in Modula-2

With all of this talk about declarations, procedures, priority levels, and such you are probably getting the idea that there must be some way to combine all of this into a program. Modules are the "glue" that performs this function. In their simplest form, a module contain a group of related procedures and data.

When used to construct a large program, however, modules serve as the building blocks for the program. Modules cleanly conceal locally declared data elements from the Global environment, preserving data integrity; they embody library procedures, saving the programmers from having to write the same functions over and over; and they spell out and enforce very exact interfaces, allowing multiple sections of programs to be developed simultaneously.

The syntax of a local module resembles a procedure. It has it's own body (designated by the keywords BEGIN/END), CONST, TYPE, VAR, and procedure declarations. Modules also contain IMPORT and EXPORT lists, which procedures do not contain. Although procedures and modules resemble each other in syntax, major functional differences exist between the two.

One of the main differences are the life spans (the time the identifiers, and memory allocated to them, exists). Procedures exist only for the duration of a procedure call. After the procedure terminates, its identifiers, such as constants, variables, and local procedures, vanish. Module identifiers, on the other hand, remain active as long as the calling module is active. One exception to the rule involves modules that are LOCAL to a procedure. These modules, like any other identifier belonging to a procedure, expire when the procedure terminates.

The syntax for a local module takes the form:

```
MODULE module name;

FROM library name IMPORT
       function list;

CONST (optional)
        only needed if there
        are any constants
        defined Global to the
        local module.

TYPE (optional)
      same as CONST.

VAR (optional)
     same as CONST.

PROCEDURE 1;
   (normal procedure declara-
    tions and body)
END 1;

PROCEDURE n;
   (same as procedure 1)
END n;

BEGIN (optional)
```

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Personal Robotics

by Tim Knight

The Past, Present, and Future of a Silicon Valley Industry

The revolution that never happened—this is a term that might be used to describe a variety of small industries that failed, despite the enthusiasm and support of the people behind them. Electric cars, solar power, and video telephones were just a few ideas that generated a great deal of excitement when they were first presented, but within a few years they were reduced to what they began as—just ideas.

The personal robot industry is a more recent example of an exciting possibility that seems to have vanished. However, like the mythological Phoenix, robots for individuals may rise up again from their ashes and form a successful industry as they were originally intended to do. The companies which make and sell small robots won't be as big as the personal computer companies of today—not for a while at least—but there is still a suficiently strong spirit in the Silicon Valley for people to continue with the development of small robots that began several years ago so that the dream of a useful and educational robot may be fulfilled.

The Introduction of Robots

The first time I had ever heard of a personal robot was in the summer of 1983 when an advertisement for the Hero-1 robot appeared in a computer magazine. I had been involved with computers since the eighth grade (in 1980), and it seemed that small robots might be an interesting area to try since I could get in on the ground floor.

That floor, however, was much less stable than it appeared at the time. In the exciting period of the early 1980s, it seemed almost too easy to become a multi-millionaire in the computer industry. Small computer companies which were formed between 1977 and 1980 were enjoying tremendous sales, and nearly every company which supported their products, including retail stores, software producers, and peripheral makers, were also prospering.

Therefore, it was tempting for many people to believe that the fantastic success which the personal computer business had experienced could be duplicated with personal robots. After all, robots were essentially computers on wheels, and the buying public seemed eager to usher high technology into their homes. Robots seemed to be the next logical step, and quite a few people in the Silicon Valley believed that their small operation would be the next rags to riches story of companies like Apple Computer in nearby Cupertino.

One personal robot company which initially received a lot of press coverage was Androbot, Inc. in Sunnyvale. Androbot was interesting to the media since it had been formed by Nolan Bushnell who had also founded the successful Atari Corp. and whose flamboyance and enthusiasm made him an excellent cover story.

Androbot was to produce four personal robots. Two of them were Androman and F.R.E.D., both of which were small and inexpensive. Androman was a foot-high robot which interfaced with the Atari 2600 so that it could be a part of the video game taking place on the screen. F.R.E.D., whose name was an acronym for Friendly Robotic Educational Device, could move around like a robotic turtle, draw using an attached pen, and speak, all by means of a remote control.

The other two robots that were intended for mass production were Topo, a three-foot high robot which could move around at the command of a nearby computer and could use its speech synthesizer to produce sounds and sentences, and B.O.B., whose name stood for Brain on Board. The "brain" of B.O.B. was a built-in computer which made the robot completely self-contained. Like Topo, B.O.B. was equipped with a variety of motion and distance sensors.

There were two major problems with all of these robots, however: (1) their high price tags ($249, $495, $1,495, and $3,995, respectively), and (2) they couldn't do anything useful. In fact, they couldn't even do anything very interesting. Nevertheless, Androbot received tremendous press coverage. Crowds of onlookers would gawk at demonstrations at electronic trade shows. Exclusive department stores called to express their interest in trying to sell Bushnell's unusual creations.

Much of the excitement, however, was simply from curiousity. No one had ever heard of a personal robot, and questions such as "what can they do?," "does it do windows?," and "why does it cost so much?" quickly revealed the frustrating reality that all these companies had to face: consumers weren't going to buy useless, overpriced playthings.

The leaders of robot companies remained optimistic, though. Androbot even arranged for Merrill Lynch to underwrite a stock offering, but because robot sales remain-

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Kodak Unveils 14-inch Optical Disk Technology

Eastman Kodak Company unveiled its 14-inch optical disk technology at the 1986 Fall Comdex and has taken the first steps to make this technology the industry standard for high-capacity optical systems or data storage.

"Optical disk technology enables Kodak to fill the current performance gap between magnetic tape and Winchester-type storage systems," said John Batterton, general manager for marketing in the equipment and systems division of Kodak's Mass Memory Division.

"Kodak believes its recent agreement with another major industry supplier on standards and second-sourcing will greatly benefit the industry, including many users whose storage requirements are not adequately met by existing storage systems," said Batterton.

Kodak's write-once/read-many items (WORM) system, which provides 6.8 gigabytes of randomly accessible on-line storage, is ideally suited for users such as government agencies, financial institutions, utilities, and engineering firms.

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```
    (statements that comprise
     the body)
END module name.
```

The module body is optional, however, they remove the burden of initialization housekeeping from the main body of the program and place it in the corresponding procedure. The details of the data structures and logic remain within the local module rather than being located in the top level of the program.

The module body is executed automatically before the first call to a procedure within the module is made. Execution of the module body occurs only once. The only assumption about the actual execution of a module body is that module bodies are executed before the module is called. If a module has a procedure, which in turn has a local module within the procedure, no assumptions can be made about the actual execution of the multiple module bodies.

Modules interface with each other by means of IMPORT and EXPORT lists. Import lists inform the compiler that the module requires a constant, variable, or procedure that the referenced module exports. If you try to import something from a module that the module does not export, the compiler will generate an error informing you of this fact. This is the mechanism by which modules hide the underlying method of performing the actual work.

Module import and export list control the visibility of the module's identifiers. There are three rules which govern the module's Scope of Visibility:

1. The visibility range of a module identifier can be extended by listing it in the module's export list.
2. The exported identifiers of a local module are not visible to another local module unless they are included in the later's import list.
3. Only the main module can import identifiers directly from an external module.

There are other details about local modules that I have not even touched upon in this article. Since the article is only meant to stimulate interest in the language I will leave it up to you to look into the finer points of local modules. The final subject that needs to be looked at also has to do with EXTERNAL modules.

External Modules

Modules come in two flavors, local and external. The local modules exist as a single entity and reside within the body of the main program. External modules are external to the main calling program. These Global modules are compiled separately and reside in a module library.

Most of the characteristics of local modules also apply to separately compiled modules. The main difference between local modules and external modules is in the fact that external modules may be compiled in two parts. These parts of an external module are called the DEFINITION part and the IMPLEMENTATION part.

The DEFINITION part of the external module contains just the declarations of the constants, types, variables, import/export lists, and the modules procedure headings. The information contained in the definition part of the module just defines what is needed to interface to the module. The IMPLEMENTATION part of the external module contains the actual procedures and the constants, types, variables that are Global only to the module.

The main benefit of dividing a module into definition and implementation parts is the separation, or insulation, of interface data and operational details. This allows you to modify the implementation portion independently of the definition part, as long as the definition identifiers are not impacted.

An example might be that you had a module that sorted a specified array using a bubble-sort algorithm. Later you found that a different sorting algorithm would work much better. With the module broken into a definition and implementation part the only part that needs to be modified is the implementation part, as long as the identifiers used to interface the module to other modules remain the same.

After the changes have been made to the implementation part of the module, it is re-compiled. Then, to incorporate the new sort algorithm into your program, all that is required is re-linking the program (Unlike ISO Pascal, which requires re-compiling the whole program!).

In Conclusion

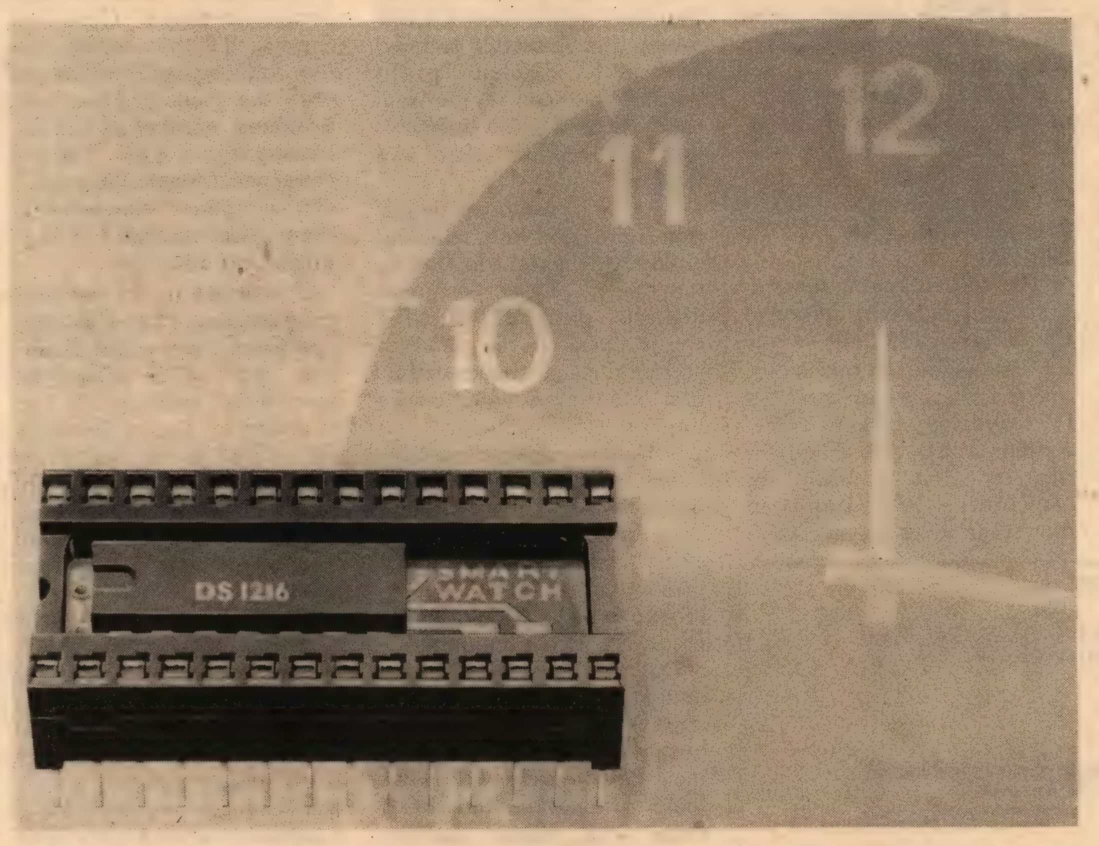
I realize that this discussion of Modula-2 has been fairly technical in nature and filled with Modula-2 "buzz words." At first, when I began working on the first draft of the article, I realized that it would be next to impossible to describe the language in any general form without it looking a lot like Pascal. Hopefully, the article has generated interest in the language to the point where you might wish to explore it further.

May you get through your next programming endeavor with all the hairs still resting firmly on your head.

GARY.... ●

The SmartWatch: Real Time Clock Control In DIP Socket

by Peter Ruber



Back in the good old days of CP/M machines, adding a battery backed Real Time Clock to your computer was a costly affair. The typical clock modules available at the time required a dozen or more support chips to make it work. And since there was no bus standard among CP/M machines, each computer required a custom designed clock board that was expensive.

A few enterprising firms ultimately designed a clock board that would interface through the Z80 CPU; but if the manufacturer's software did not support your specific disk format, you were out of luck—unless you had access to a conversion program that allowed your computer to read the alien disk format. Even so, a clock board had limited applications. If your CP/M computer was used as a means of controlling a remote device whose operation depended on critical timing, then a clock was necessary. Clock boards were also useful in Bulletin Board Systems so that a caller's access time could be logged. But for practical applications, such as stamping the date on your disk directory files, a clock was useless, because the CP/M BIOS did not support this function.

When MS-DOS finally arrived, entering the date and time during the boot procedure was an intregal part of the program's operation, as this information was automatically placed on the disk directory. This convenience made it easier to locate specific files at a later date by being able to isolate the time period in which they were written.

Heath/Zenith computerists who also worked with the H-8 and H-89 systems, and used HDOS (the Heath Disk Operating System), may have noticed some subtle similarities between HDOS and MS-DOS. The relationship is not tenuous, because the same programmer supervised the development of both operating systems.

In 1977, when Heath launched the H-8, they had no programmers to speak of. So they hired Wintek Corp., a firm that specialized in program development for mainframes as well as manufacturing computerized interfaces for the industrial market, to develop the firmware and operating system for a variety of Heath products. The man in charge of this project was Gordon Letwin, whose office was shifted from Indiana to Benton Harbor, Michigan.

Since Heath was determined to enter the computer market in a serious way, they lured Letwin away from Wintek and started their own in-house software development. Not long after the H-89 appeared in 1979, and after HDOS had emerged as a sophisticated operating system, that supported the dating of disk directory files, Letwin was in turn lured away by Microsoft and put in charge of creating what was to be called MS-DOS, a project he still supervises.

The Clock In A Socket

The computer clock has finally emerged in a compact and ingenious design standard from Dallas Semiconductor, a new player in the Silicon Sand Box. It's called the SmartWatch, and is just one of a series of "intelligent" sockets that have quickly made Dallas Semiconductor a serious contender in Integrated Circuit design.

The SmartWatch imbeds a clock chip and a lithium battery inside the hollow of a 28-pin DIP socket. This socket then plugs into a CMOS RAM or ROM socket on your computer, and the Integrated Circuit that belongs in that socket is then plugged into SmartWatch. There are several variations of SmartWatch that it will fit under nearly every CMOS static RAM or ROM chip currently available, as well as higher density chips that are still to come.

Unlike most lithium batteries now on the market which have a life expectancy of 3 to 5 years, the SmartWatch is rated for 10 years. This means it will probably outlive your computer by many years.

One of the key features of the SmartWatch is that the watch function remains transparent to RAM. Access to setting and reading the clock is established by pattern recognition on a serial bit stream of 64 bits. Chances of this bit stream coming in conflict with any RAM data is 1 in 10 (19). This bit stream must be matched by executing 64 consecutive write cycles containing the proper data on DQ0. All accesses which occur prior to recognition of the 64 bit pattern are directed to memory. After recognition is established, the next 64 read or write cycles either extract or update data in the SmartWatch, and memory access is inhibited.

To explain this more succinctly, the following is quoted from Dallas Semi's 1987 Product Data Book:

"Data transfer to and from the timekeeping function is accomplished with a serial bit stream under control of chip enable (CE), output enable (OE), and write enable (WE). Initially, a read cycle to any memory location using the CE and OE control of the SmartWatch starts the pattern recognition sequence by moving a pointer to the first bit of the 64 bit comparison register. Next 64 consecutive write cycles are executed using the CE and WE control of SmartWatch. These 64 cycles are used only to gain access to the SmartWatch, therefore, any address to the memory in the socket is acceptable. However, the write cycles generated to gain access to the SmartWatch are also writing data to a location in the mated RAM. The preferred way to manage this requirement is to set aside just one location in RAM as a SmartWatch scratch pad."

"When the first write cycle is executed, it is compared to bit 1 of the 64 bit comparison register. If a match is found, the pointer increments to the next register and awaits the next write cycle. If a match is not found, the pointer does not advance and all subsequent write cycles are ignored. If a read cycle occurs at any time during pattern recognition, the present sequence is aborted and the comparison register is reset. Pattern recognition continues for a total of 64 write cycles as described above until all the bits in the comparison register have been matched. With a correct match of 64 bits, the SmartWatch is enabled and data transfer to or from the timekeeping registers may proceed. The next 64 cycles will cause the SmartWatch to either receive or transmit data on DQ0, depending on the level of the OE pin or the WE pin. Cycles to other locations outside the memory block can be interleaved with CE cycles without interrupting the pattern recognition sequence or data transfer sequence to the SmartWatch."

SmartWatch continuously monitors VCC for an out of tolerance condition. When such a condition occurs, the internal lithium energy call is automatically switched on and write protection is unconditionally enabled to prevent loss of watch and RAM data.

Most conventional RTC clock boards use a low leakage diode that prevent current from flowing into the lithium battery when it operates from computer power. The SmartWatch contains an internal switch that directs power from the battery or VCC supply, depending on which voltage is greater. A second switch function provides power fail detection that typically occurs at 4.25 volts. Finally, the nonvolatile controller protects the SmartWatch register contents by ignoring any inputs after power fail detection has occurred. Power fail detection also has the same affect on data transfer as the RESERT input.

It provides time keeping information including hundreds of seconds, seconds, minutes, hours, day, month, and year information. The date at the end of the month is automatically adjusted for months with less than 31 days, including correction for leap years, a feature that some Real Time Clock chips do not support. The SmartWatch operates in either 24-hour or 12-hour format with AM/PM indicator.

Stumbling Over SmartWatch

I first encountered the SmartWatch in one of the new Ampro Computers products called the SCSI/IOP (Input/Output Processor). It's a multi-purpose board that can provide a SCSI interface for a STD Bus industrial control system, as well as for the VME, Multibus, DEC, IBM-PC, and other bus systems. It can be stuffed with up to 56K RAM for software control of external devices from the host system.

When I skimmed over the SCSI/IOP documentation after the board arrived, reference to the SmartWatch didn't capture my imagination; and I didn't correlate its significance until several days later. I assumed that my board had been shipped with the RTC installed. But that wasn't the case when I looked for the clock chip and couldn't find it.

The SmartWatch, it seemed, plugged into one of the CMOS RAM sockets. A 2K x 8 or 8K x 8 CMOS RAM chip could then be plugged into the SmartWatch socket. Even more interesting was the fact that Dallas Semiconductor's SmartWatch concept had been

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SmartWatch

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carried further, as they also manufacture intelligent sockets with imbedded lithium batteries so that you can maintain your program in RAM when you turn off the system's power. This is especially useful in devices like the SCSI/IOP, if they are to monitor alarm systems, remote data acquisition, laboratory equipment, or even activate remote devices at specified times through the time control of SmartWatch.

Computer systems and boards designed to use CMOS static RAM devices can be converted to nonvolatile status by substituting the existing chips with Dallas Semiconductor Nonvolatile Memory Modules. These are the DS1220, which is a 2K x 8 6116 equivalent, and the DS1225, which is an 8K x 8 6264 equivalent device.

The SmartWatch is currently available in 3 models:

1) DS1216: Accepts 24-pin 2K x 8 or 28-pin 8K x 8 CMOS static RAM.

2) DS1216C: Accepts 8K x 8 or 32K x 8 CMOS static RAM.

3) DS1216E: Accepts any 28-pin byte wide.

CMOS static RAM or 8K x 8 2764 EPROM or 4K x 8 2732 EPROM.

The accompanying illustration details how each version of the SmartWatch allows the RTC to tap into the system bus.

For a relative new-comer to IC technology, Dallas Semiconductor has, since launching its first product in November 1984, produced more than three-dozen CMOS integrated circuits. Their 448-page 1987 Product Data Book indicates that they specialize in catering to the computer and communications industry, selling "soft silicon" which can be readily tailored to solve specific problems. Soft silicon results from the Late Definition technologies of lithium, laser and implant.

```
          "SMARTWATCH" SOFTWARE


This program is written in 8086 Assembly Language.
Copyright, 1986, by Dallas Semiconductor Corp.




;
;           SET SSSS TO THE SEGMENT OF MEMORY WHERE
;           THE SMARTWATCH WILL BE ACCESSED
;
SWATCH      SEGMENT AT SSSS
;
;           SET 0000 TO THE OFFSET OF THE SCRATCH MEMORY
;           BYTE USED TO COMMUNICATE WITH THE SMARTWATCH
;
SCRATCH     EQU         0000
;
SWATCH      ENDS
;
CSEG        SEGMENT PARA PUBLIC 'CODE'
            ASSUME CS:CSEG,DS:CSEG
;
PAT         DB          0C5H,03AH,0A3H,05CH,0C5H,03AH,0A3H,05CH
;
DTA         DB          0,0,0,0,0,0,0,0
;
PATREC      PROC        NEAR
            PUSH        ES                      ;SAVE ES
            MOV         AX,SEG SWATCH           ;SET ES TO
            MOV         ES,AX                   ;SEGMENT OF SCRATCH
            MOV         CX,64                   ;DO 64 BITS
            MOV         SI,OFFSET PAT           ;SET INDEX TO PATTERN
                                                ;RECOGNITION
            MOV         DI,OFFSET SCRATCH
PR1:        TEST        CX,7                    ;LOAD NEXT BYTE?
            JNZ         PR2                     ;NO!
            LODSB                               ;GET NEXT PATTERN BYTE
PR2:        MOV         ES:[DI],AL              ;WRITE DO
            SHR         AL,1                    ;PREPARE NEXT DATA BIT
            LOOP        PR1                     ;LOOP BACK
            POP         ES                      ;RESTORE ES
            RET                                 ;RETURN
PATREG      ENDP
;
WRWATCH     PROC        NEAR
            PUSH        ES                      ;SAVE ES
            MOV         AX,SEG SWATCH           ;SET ES TO
            MOV         ES,AX                   ;SEGMENT OF SCRATCH
            MOV         CX,64                   ;DO 64 BITS
            MOV         SI,OFFSET DTA           ;SET INDEX TO DATA
            MOV         DI,OFFSET SCRATCH
WW1:        TEST        CX,7                    ;GET NEXT BYTE?
            JNZ         WW2                     ;NO!
            LODSB                               ;GET DATA BYTE
WW2         MOV         ES:[DI],AL              ;WRITE DO
            SHR         AL,1                    ;PREPARE NEXT DATA BIT
            LOOP        WW1                     ;LOOP BACK
            POP         ES                      ;RESTORE ES
            RET                                 ;RETURN
WRWATCH     ENDP
;
RDWATCH     PROC        NEAR
            PUSH        DS                      ;SAVE DS
            MOV         AX,SEG SWATCH           ;SET DS TO
            MOV         DS,AX                   ;SEGMENT OF SCRATCH
            MOV         CX,64                   ;DO 64 BITS
            MOV         SI,OFFSET SCRATCH
            MOV         DI,OFFSET DATA          ;SET INDEX TO DATA
RW1:        JCXZ        RW2                     ;DONE?
            MOV         AH,[SI]                 ;READ DO
            SHR         AX,1                    ;PREPARE NEXT DATA BIT
            DEC         CX                      ;UPDATE COUNTER
            TEST        CX,7                    ;SAVE NEXT BYTE?
            JNZ         RW1                     ;NO!
            STOSB                               ;SAVE DATA BYTE
            JMP         RW1
RW2:        POP         DS                      ;RESTORE DS
            RET                                 ;RETURN
RDWATCH     ENDP
;
CSEG        ENDS
            END
```

Lithium postpones definition until end use, thereby making the chip adaptive in the system. Laser postpones definition until just before the chip is placed in the package, and implant postpones definition until the last wafer process step.

Advances in CMOS circuitry have reduced power requirements to the point that a chip, using appropriate circuitry, can be packaged with a miniature lithium energy source which will last the useful life of the equipment.

Dallas' laser method creates uniqueness on a chip. The submicron positioning laser and formidable control software they have developed allows them to engrave individual chips with digital patterns making each one different. One of their first products in this category was the DS1000 Silicon Delay Line series which is a direct replacement for conventional hybrid delay lines used widely in conjunction with DRAMS and Winchester disks.

Their implant technology will go into operation in 1987. Nearly-finished wafers can be defined to meet a customer's exact requirements in a matter of days. This technology will provide a low cost alternative to producing "custom" chips for computerized applications. The traditional design stages of drawing literally thousands of ciruits and gates and the accompanying high manufacturing costs will have already been accomplished, and the chip can then be customized in short production runs at affordable rates.

Getting A SmartWatch

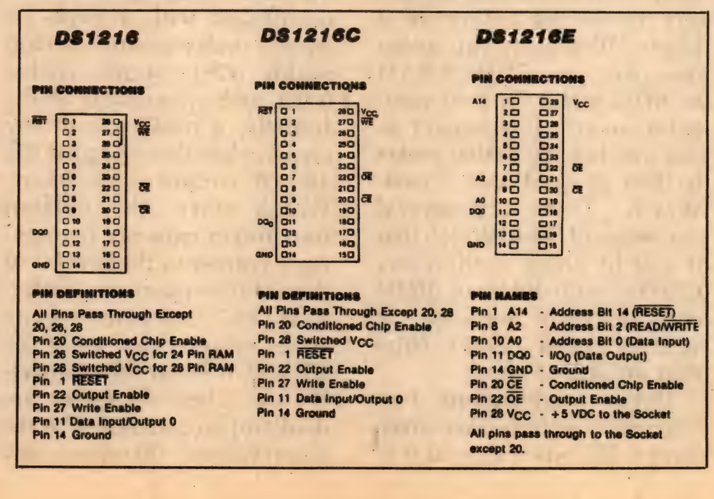
Since Dallas Semi is a prime manufacturer, they do not sell individual SmartWatch modules. They sell direct to OEM's and large volume users, and through a wide network of local and regional distributors. You can call or write to Dallas Semiconductor's Customer Service, tell them where you live, and they will provide you with the name, address and telephone number of the distributor closest to you. The cost varies according to the module you want, but is somewhere in the neighborhood of $14-15 in single unit quantities.

If you like to do you own programming, I have included a program at the end of this article written in the 8086 Assembly Language. It was provided by Dallas Semiconductor and is copywrited by them, and therefore may not be used as in any commercially distributed product without their permission. But you may adapt it for your personal use.

The methods by which the time function of the SmartWatch is accessed allows for retrofitting existing designs which use a 28 pin bytewide sockets. The hardware design is left intact, and only a software change is required to add a calendar feature to previously designed systems. Moreover, most systems only require time information on power-up since time is kept track of by the operating system while power is applied. In these applications, the software overhead is reduced to an algorithm which is executed only when the machine is turned on.

The software needed to cause entry and update for the SmartWatch consists of three subroutines. The first is called PATTREC, will wake up the SmartWatch and get it ready for reading and writing. After pattern recognition has been established, one of two subroutines is used to either extract information or update the SmartWatch. The WRWATCH routine will write the 8 watch registers of the SmartWatch. The RDWATCH will extract information from the SmartWatch.

On an alternative basis, ready-to-use packages are currently available from several sources, with restrictions noted. I have no doubt that by the time this article appears, there will be a deluge of SmartWatch packages for most computers.


DS1216
PIN CONNECTIONS
RST
VCC
WE
OE
CE
DQ0
GND
PIN DEFINITIONS
All Pins Pass Through Except 20, 26, 28
Pin 20 Conditioned Chip Enable
Pin 26 Switched VCC for 24 Pin RAM
Pin 28 Switched VCC for 28 Pin RAM
Pin 1 RESET
Pin 22 Output Enable
Pin 27 Write Enable
Pin 11 Data Input/Output 0
Pin 14 Ground
DS1216C
PIN CONNECTIONS
RST
VCC
WE
OE
CE
DQ0
GND
PIN DEFINITIONS
All Pins Pass Through Except 20, 28
Pin 20 Conditioned Chip Enable
Pin 28 Switched VCC
Pin 1 RESET
Pin 22 Output Enable
Pin 27 Write Enable
Pin 11 Data Input/Output 0
Pin 14 Ground
DS1216E
PIN CONNECTIONS
A14
VCC
OE
A2
CE
A0
DQ0
GND
PIN NAMES
Pin 1 A14 - Address Bit 14 (RESET)
Pin 8 A2 - Address Bit 2 (READ/WRITE
Pin 10 A0 - Address Bit 0 (Data Input)
Pin 11 DQ0 - I/O0 (Data Output)
Pin 14 GND - Ground
Pin 20 CE - Conditioned Chip Enable
Pin 22 OE - Output Enable
Pin 28 VCC - +5 VDC to the Socket
All pins pass through to the Socket except 20.

Zenith Data Systems and its subsidiary, the Heath Co. (Benton Harbor, MI 49022), offer the SmartWatch as product number CB-5063-50 for $59.00. This item is usable on all Heath/Zenith PC compatible computers, except for their H/Z-200 (the AT compatible) and the Z-171 portable. It will also work with most standard PC/XT systems.

FBE Research Company (P.O. Box 68234, Seattle, WA 98168) offers a similar package for H/Z computers for only $39.00. The only difference is in the price. FBE Research has, over the past decade, produced clock boards for all H/Z computers. Their designs were also licensed for the DEC "Rainbow" computers and other systems.

Ampro Computers (67 East Evelyn Avenue, Mountain View, CA 94041) has the SmartWatch packages available for their SCSI/IOP interface, and their CP/M and PC-DOS single board computers. The prices vary according to the board.

After you have placed the appropriate program on your MS-DOS disk, call up the program and set the DOS time and date. Then RESET the system. Using EDLIN, or any ASCII-based text editor, create an AUTOEXEC.BAT file with the name of the clock program. When you reboot, the BAT file will automatically read the clock, and enter the time and date. If you work with a variety of programs on a regular basis, it is recommended that you place the clock program and the BAT file on every disk. If you want the system to also load the program on that disk, include its name in the BAT file.

As a hint to the emerging popularity of this product, I recently encountered an ad in one of the major computer publications from a mail order dealer selling something called the "No-Slot Clock." When I investigated, I was informed that it came from Taiwan without any brand identity. The "cloners" seem to recognize the hot stuff when they see it.

The SmartWatch is an exciting product. And the many other Dallas Semiconductor products that provide battery backup for static CMOS RAM, and RAM cartridges for laptop computers, are intelligent applications that will make our computers more versatile tools.

For additional information, please contact: Dallas Semiconductor Corporation, 4350 Beltwood Parkway, Dallas, TX 75244; (214) 450-0400. ●

Stan Veit's History

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computers. On the ground floor we had our sales area and my office and the balcony was Dede's office area.

The business had grown from 10 kits to over a million dollars a year and we kept plowing most of it back to fuel our growth. We were the first Apple dealers east of California. We sold South West Technical Products 6800, OSI computers, North Star, Cromemco and IMSAIs. We also sold Processor Technology SOL's which were our best seller. In most cases we were the sole dealer in New York City. The little machines had grown up and could actually do some of the things that were promised in the beginning. The hanger-outs were now select groups and they did not mix. The Big Apple Users Group started in our store and met there in the evening. The SOL Users Group also met in our store and I taught a class every Tuesday provided by the New School for Social Research. People wandered in and out at all hours of the day. The computers were always on and working. If we had to demo a computer or some software to a paying customer, we would have to bounce off one of the regulars from the computer. "Bruce, you got two minutes to sign off, or I'll pull the switch!" I never did pull the switch because Bruce would have lost all the work he had been doing for a week. Where else could he get a free computer to use?

My wife always claimed that I wrapped a one hundred bill around everything I sold in the form of free consulting and service. Perhaps she was right but how else could I have introduced computers to New York? Besides the hangers-out did bring in other customers. We never did pay our employees much more than minimum wages, but they would have paid me just to be around the computers, if the law allowed. Many of them did outside consulting and programming for ten times what I could pay them. They used my machines and software and sold my customers and repaired their machines.

There was Ken who was our 6800 expert, and David who I have already mentioned, Jim who in real life was VP of a software service company, but did all my SOL repairs at home. There was Doc, a medical doctor at a nearby hospital who was our software expert and Michael who ran software and consulting out of our location and later became president of a big computer company. Not to mention Ozzy who was my manager until I found out that he was publishing the Phone Freaks newsletter on my computers and using them to maintain TAPs (The Phone Preaks Organization) data base.

My partner, Mike was also a CPA who was nuts about computers and I was on friendly terms with many business leaders and celebrities who came into the Computer Mart and got stuck on computers.

Besides being a hang-out for the computer nuts of New York, Computer Mart was a place where you could buy anything you needed in computer parts or supplies. We stocked all kinds of chips, sockets, cables and connectors. Tape and disks were only found in stock in our store. Big companies who bought supplies from large suppliers found that they could buy it from us when they ran out and this led to all kinds of other business.

One day a large group of Chinese came in and bought $1,500 worth of TTL chips from us. They asked for a discount for cash and I quickly gave it to them, thereupon they pulled out a roll of hundred dollar bills that would choke a horse and paid me. The next day the FBI came in and asked to see me. "We understand you sold the Red Chinese a load of electronic integrated circuits." "Well," I said, "At least a large paper sack full." "What did they buy," the agent asked, "Does it have anything to do with nuclear physics?" I had kept a list of the chips in order to replace them in our inventory and I explained that except for a few CPUs like 8080 and 6800 and 6502 chips they were mostly ordinary TTL chips. The agent asked what I thought they would do with them. "Build a computer like everyone else who comes in here." I answered. "What should I do if they come back, should I sell them?" "Sure," he answered, they may be Red but their money is green." "Just call us and tell us what they bought, please." The Chinese never came back.

However because we were in New York, we got a stream of international visitors and

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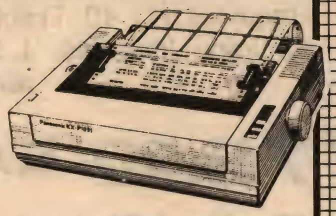

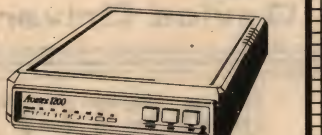

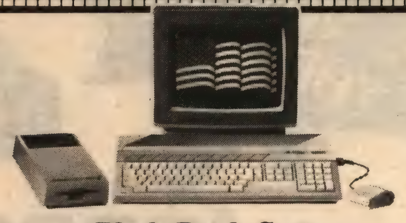

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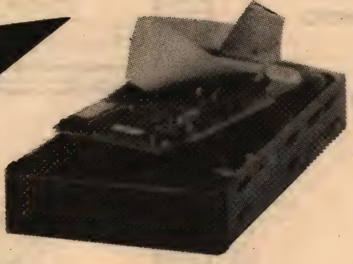

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Stan Veit's History

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customers. Many of them paid cash, wrapped their purchases in their underwear and smuggled it back into their countries.

One day a handsome gentleman with one of the most beautiful women I had ever seen came into our store. He asked to see a computer system and it just so happened that Jim was there instead of one of our creeps. Jim called me and the two of us could not stop looking at the lady who was introduced only as Carmen. Some Carmen! The gentleman asked us to price out a complete CP/M system and give him a Pro forma invoice for it with the name of our bank. The system came to $25,000. He gave us his card identifying him as an ambassador of a South American country, a large one at that. Well we forgot about the computer only remembering the lady and we often mentioned her saying that this was the best computer we never sold. Then one day we got a call from South America telling us that an inspector was on his way to inspect the computer and we were to teach Carmen to use it in that country's New York tourist office. The $25,000 was laying in our bank account since two days after the ambassador's visit and they had never told us about it! Considering that the disk drives had to come from California, we did a super fast job of getting that system running in time. The inspector turned out to know nothing about computers and he blew the operating system the first time he tried to use it. So we assigned one of the troops to take him out on the town and keep him happy for three days. We passed inspection and Jim taught Carmen all about computers. It is said that Jim learned a few things also, but he never admitted it, he just smiled when I paid him for his time.

One day Ben Rosen (now Chairman of Compaq and Lotus) called me and told me I was getting a distingushed visitor. A few hours later a tall man came into my store and introduced himself as Charles Tandy. He asked if I would talk to him about microcomputers. "Sure," I replied, "The problem is getting me to talk about anything else." We talked all afternoon, he was one of the most dynamic people I had ever met and he understood what I told him about the business, but he said, "its wrong and things have to be a lot different if this business is to grow at all." Then he asked me to come to Ft. Worth with him the next day. Well, I knew that Mr. Tandy was about to do something in computers and I wanted to know what it was, so I told him that I would be glad to go with him. The next day we flew with his staff in his private plane. When we landed in Ft. Worth we went right to the Radio Shack offices. They showed me the prototype TRS-80 Model 1, I was impressed. Then they asked me how much it should sell for? I compared it to the SOL I was selling for $1,500 and found it equal. Knowing the power of Radio Shack I said it should sell for about $1,200. "Suppose we sell it for $600," they asked. "You better make a hell of a lot of computers if you sell for $600." "How many?" "About 50,000 to start with," I answered. "You're nuts, no one has ever made that many computers of one type, not even IBM, nobody has ever made 5,000," Mr. Tandy's experts replied. "We are going to make 10,000. " "You're never going to catch up," I said. Later Mr. Tandy asked me about this and I repeated my prediction of 50,000 sales. They made 15,000 on the first run and never caught up to sales for over a year. The next day he called at my hotel, he took me out to Tandy Center which was then being built. He told me all about his life and the building of Radio Shack. He said that all the people who stuck with him were now millionaires. Then he offered to buy my store and give me a job training his people to sell computers. I turned it down and went back to New York. I never saw him again because he died shortly after that, but he has been one of my heros. There was only one Charles Tandy. The world runs on people like him. ●

Kodak Unveils

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The system can also meet the storage needs of image processing and publication applications that require high-capacity storage for line drawings, blueprints, CAD/CAM designs, maps, and other graphics.

Batterton stressed that Kodak's approach is unique in that it offers a complete storage system.

"Recording technologies are so complex that it's not enough to do just the media or the drives," said Batterton. "You have to put the heads, media and electronics—a whole package—together in a workable system."

The 14-inch optical disk, which will be manufactured by Kodak's subsidiary Verbatim Corporation, is composed of an aluminum substrate covered by a highly sensitive and stable dye polymer recording layer. A cover sheet, made from a proprietary polycarbonate resin, protects the recording layer from dust. Further care is provided by a caddy that remains with the disk at all times.

High-performance transfer and access rates characterize the disk drive. The transfer rate is one megabyte per second, and average access time within a band is 100 milliseconds at this time.

The drive also incorporates diagnostic and error correction devices, as well as features to protect the disk from vibration and contamination. A variable recording technique enables data to be written at a constant density, maximizing the capacity of the disk.

"Kodak has but tremendous resources into developing its optical disk technology in order to ensure a system that meets the needs of today's marketplace and to guarantee that Kodak sets the standard in high-capacity optical storage systems in the future," Batterton said.

Kodak expects to begin shipment of evaluation units of its optical disk system in early 1987 and shipment in quantity the end of next year.

For more information contact: Corporate Communications, Eastman Kodak Company, 343 State Street, Rochester, NY 14650, 716-724-5079.

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Personal Robotics
continued from page 262

ed extremely low, the deal was cancelled. Only F.R.E.D. and Topo were actually ready to be shipped, and dealers quickly discovered that people would be curious about the robots they stocked but would rarely buy them. After all, there was no reason for a person to spend almost $1,500 for something that could only roll around a room and say a few sentences.

Probots and People

After examining the information about the Hero-1, Androbot's robots, and the RB5X, I decided that my sixth book would be about robots instead of computers. Although seventeen years old at the time, I was confident that a publisher could be convinced that a book of this sort would be a big seller when the touted personal robot revolution began. Adam Osborne's *Introduction to Microcomputers*, had sold 300,000 copies since its introduction, so it seemed logical to surmise that a book on robots would experience similar success once enough people wanted to learn more about them.

My literary agent in New York tried to find a publisher willing to take on the book, but he was unsuccessful. On the same day his rejection notice came in the mail, I contacted the publisher McGraw-Hill myself and was able to get a contract for my book, *Probots and People: The Age of the Personal Robot.* The book included information about the personal robots currently available (including Topo, the Hero-1, and various educational robot arms) and speculations on how the industry might grow.

Because the book was written at the height of the excitement surrounding these new robot companies, my predictions were somewhat too optimistic about the future of "probots." According to large market research firms such as Future Computing and the International Resources Directory, personal robots would be a $2 billion industry by 1992. Projections such as these looked good in business reports, and a number of investors put enough money into these young companies to keep them going for a year or two more.

As a high school student, I was sure that I wouldn't be able to get money from outside sources for any robot venture of my own. Instead, I pooled together $10,200 with two friends to launch *Personal Robotics Magazine*. We assumed that a person would spend $21 to get a magazine about personal robots long before he would invest thousands in the real thing.

The introduction of *Personal Robotics Magazine* (PRM) took place at the First International Personal Robot Congress held in Albuquerque, New Mexico in April of 1984. Since the brochure for IPRC predicted that 5,000 would attend, we paid for a booth space and knew that it would be our best opportunity to introduce our glossy new magazine to a robot-hungry world.

Unfortunately, IPRC was a failure: Only 700 people came to the show, most of whom were curious locals that had never seen robots before. They came in and checked out the robots—and PRM—but left feeling what they had seen was merely an interesting oddity and certainly nothing worth spending any time or money on.

Only a year after the personal robot industry had appeared, it seemed that there wasn't much hope of striking it rich or even making a decent living by creating, selling, or supporting such high-technology machines. No matter how visually interesting a robot was or how many features it had, no one wanted a household companion that couldn't relieve them of some of the tasks that they believed a robot could handle. One of the major problems with personal robots has always been the public perception of what a robot is. Because the only exposure the public has received has been in the form of C3P0 or Robby Robot from *Lost in Space*, the robots of today are bound to be disappointing. They can't do the dishes, vacuum the house, or even hold a decent conversation.

A similar problem, though, was experienced by personal computer makers in the 1970s. Most people thought of computers as electronic "brains" and did not realize that computers are very stupid until a human programs them to carry out a specific task. As computers grew more popular, individuals began to think of them realistically, and they no longer expected their computer to balance their budget, control all the appliances in their house, or print a letter without any assistance first.

Personal Robotics Magazine, like other small robot companies, struggled along through 1984. The typesetting and printing costs were expensive, and because the robot companies that advertised in PRM usually couldn't afford to pay their bills, the magazine was losing money quickly. Worse than that was the fact that, despite all of our promotion and advertising efforts, only about 300 people had paid for their subscription to PRM.

At one show where we were promoting the magazine, we met a man named Rich Amoroso who had a robot retail store. Because there was only one other such store in the country (RobotLand in Boca Raton, Florida), we were interested in talking with him and learning about his business. One idea that came up before the show ended was to open the same sort of robot store in the Silicon Valley. Of all the places in the world where a robot store would succeed, the technology-oriented area around San Jose seemed to be the most promising.

The End Of PRM And The Birth Of A Store

By December of 1984, *Personal Robotics Magazine* was out of money. Although subscribers were very enthusiastic about the quality and content of the magazine they were receiving, we didn't have enough cash from advertisers or subscribers to keep publishing. If we had printed PRM on cheap paper and published issues that were only four or eight pages long (instead of 24), we would probably have had plenty of money to keep on going. It was too late for that, however, and we had to stop publishing the magazine after losing $10,200 between the three of us.

That amount of money is a fortune to eighteen year olds, but the idea of a Silicon Valley robot store persisted, even though the outlook for personal robots was very dim. By pooling together the money from the technical books I had written as well as from a couple of other investors who had the same kind of faith in the idea that I did, Robot Center was born. Rich Amoroso's robot store, Amarobot, closed early in 1985, but I wrote a business plan for what we believed would be the largest personal robot retail chain in the United States.

More Snow In The Valley

The success stories a person reads have a lot to do with his motivation for starting and expanding a business. There are many books on how people became successful in the business world, and at least ten different books can be found about Silicon Valley success stories (such as *The Little Kingdom and The Computer Entrepreneurs*). Whereas a robot engineer might dream of himself as "the Steve Wozniak of robots," we saw ourselves as "the Paul Terrell of robots." Paul Terrell had, ten years before Robot Center opened, founded the Byte Shop in Mountain View, which was the first personal computer store in the Silicon Valley.

When Terrell told friends of his plans to open the Byte Shop, they remarked in disbelief, "it never snows in Silicon Valley." On the day his store opened, a rare snow fell in Mountain View. In 1985, precisely ten years after the Byte Shop opened, Robot Center began selling robots. Early that day, snow began drifting down from the sky.

Despite the seemingly prophetic circumstances surrounding the store's first day of business, things did not go as well as we had planned. We experienced the same sort of curiousity-seekers that the robot industry had known for so long, and many people found our expensive robots unattractive since they didn't serve any real purpose. We never thought of a good answer to the question, "What does it do?," so Robot Center quickly changed from a retail outlet for personal robots to a robot toy store.

Although our original plans were to have one-hundred stores open by 1990 generating forty-million dollars in sales, our concerns became much more short-term: we didn't know if our first store would survive. It wasn't easy for a small store to compete with a discount giant like Toys 'R' Us.

As usual, the whole small robot industry was suffering. Robot makers like Androbot, RB Corporation, and several others fell into bankruptcy,and any robot book, magazine, or add-on product that was introduced to the market quickly faded due to unpopularity. If there was an excellent product which was useful and relatively inexpensive, we knew that the industry might pick up momentum and eventually succeed. Unfortunately, because robot makers had introduced their products with the hopes that they would be as wildly successful as computer companies, they hadn't taken the time to plan well. What they had to sell was completely inadequate, and by the time they realized the problem, they didn't have enough money left to engineer and produce a better robot which people would accept.

At Robot Center, we had originaly planned to sell $130,000 of robots and robot-related items during the first year. On December 24, 1985, Robot Center closed with $70,000 in sales during the first nine months of business. It had lost its founders almost $10,000 in the process.

After The Shake-Out

At the beginning of 1986, there was hardly a personal robot industry to speculate about. Companies involved with "probots" had a shake-out similar to that of the personal computer industry. An important difference, however, was that there were plenty of computer companies left after that industry's shake-out. In robots, there were no more than twenty-five people in the country in a business related to small robots for schools or homes.

There was a positive aspect to all of the scorched earth behind personal robots, however; everyone had a chance to start off fresh, and there was more of a grass-roots effort behind the technology. There weren't any big-name personalities, stock offerings, or corporate offices in personal robot companies. However, there were people who still had faith that they could bring small robots to individuals to teach them about an industry that will be vital to our future. Those same people also hoped that they would later provide robots that could do useful tasks around the house.

There were several products introduced in 1986 that gave people in the business new hope. The Hero-2000, for example, was a far more sophisticated robot than its predecessor, the Hero-1. Although it cost $4,500, it was sophisticated enough to serve as an outstanding educational tool for high schools and colleges interested in teaching their students about robots, how they work, and how they can be used in business, industry, and the home.

Although the RB Robot Corporation had gone bankrupt, two men took the same technology and introduced the RB5X to the market once again, this time through a company called General Robotics. This robot was identical to the original RB5X, but it came with a host of curriculum guides. Because the focus of General Robotics was now on the educational market, the robot started selling well to schools and dealers. New products introduced by other companies included a $450 arm that moved without motors, a complete system for setting up a miniature factory with working robots, and a kit which could be assembled to make a fully-functioning, computer-controlled robot arm for under $250.

Besides the few manufacturers which were just beginning to succeed at selling their products, one company that was also beginning to turn around was Rio Grande Robotics of Las Cruces, New Mexico. Niki Delgado, the president of the two-person company, had always believed that robots had a place in the classroom. By 1986, she and her partner Bill were succeeding. Even though the predicted sales of $150,000 in

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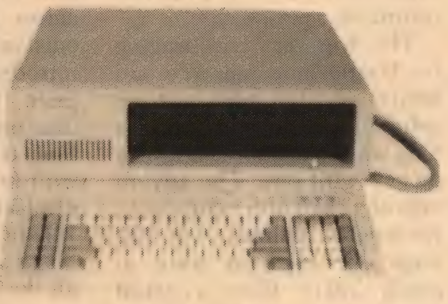

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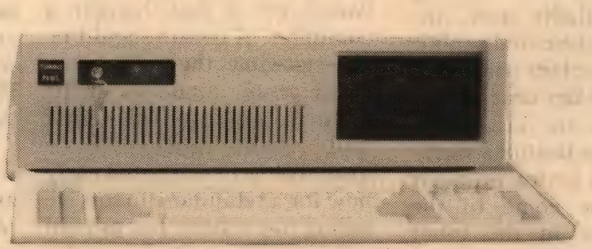

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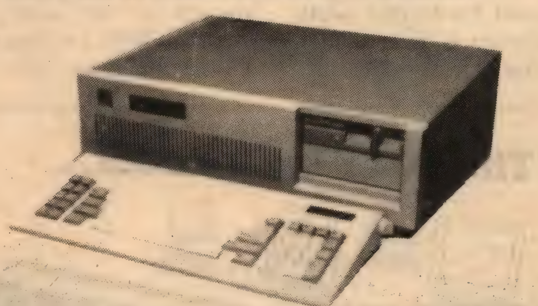

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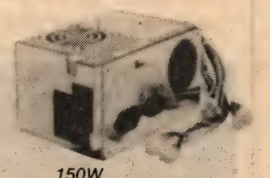

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Personal Robotics continued from page 268

1986 is not a staggering amount, the company is profitable, and any profits in the personal robot industry are a welcome relief.

Stumbling Upon Valley Robotics

After experiencing low sales of my robot book, the failure of *Personal Robotics Magazine*, and the closing of Robot Center, I didn't want to lose any more time or money in an industry that didn't seem to have much of a future. However, shortly after Robot Center had closed, I received a very interesting letter addressed to Valley Robotics.

Valley Robotics was nothing more than a partnership which my friend Darren LaBatt and I had created in 1984 to see if we could sell robots through mail order, as Rio Grande Robotics had done. Our advertisement in *Robotics Age* hadn't yielded a single sale, so by early 1986, we had almost completely forgotten about our mail order idea.

The letter addressed to Vally Robotics quickly refreshed our memory, however; in it was an order from the federal government for $9,000 worth of robot products. Even though most schools in the U.S. are operated by state governments, the federal government has hundreds of schools abroad for the children of military personnel. One of these Department of Defense Dependent Schools (DoDDS) located in Germany had seen the advertisement in *Robotics Age* and decided to order some products from our company.

This was very encouraging for Darren and me. We had been involved in robot ventures before, but this was the first time we had actually made any money with one. The advantage of a mail order company, we quickly realized, was that since our expenses were so much lower than a retail stores', it would be easy to make both our products and our business known without risking much money.

Every capital intensive business I had tried (*Personal Robotics Magazine*, Robot Center) had failed, whereas thought-intensive efforts (writing books, Valley Robotics) had succeeded. One of the best lessons I learned through these experiences was that when a person is young and doesn't have much money to spare, it's much better for him to risk his time and use his mind than to invest an unsafe amount of his money in a business. With a company like Valley Robotics, the worst possibility is that we won't sell any more robots and we will have lost some time in trying to do so.

The Present And Possible Future Of Personal Robots

The personal robot industry is still a minute, tenuous collection of ventures spread out across the country. Even if outstanding, useful robots are introduced at a reasonable price, there is no guarantee that people will buy them or that outside developers will support them with other products.

However, the people which make up Valley Robotics and all the other small robot companies do have the advantage of experience. We all know that if there is ever going to be success in this field, we are responsible for it, just like groups such as the Homebrew Computer club were very much responsible for the growth of personal computers. There are many interesting products available now, including sophisticated robot arms, mobile robots with voice synthesis, and kits which teach people about the electronics and mechanics behind a working robot. As better products such as these come to the market, those in the robot business will need to teach people about them, support them, and introduce peripherals and software to increase their value.

Individuals involved with the design and marketing of these and future products will have to remember some of the painful lessons that they learned in the early 1980s. First of all, computers and robots don't always mix; many people assumed that everyone interested in computers will also be a potential robot buyer. Although robot enthusiasts appreciate technology, not all of them are computer buffs, and vice versa. Computers, however, will be a key part of future robotics. It is much cheaper to purchase a robot controlled by a computer than it is to buy a robot which contains a computer itself. Wireless links such as infrared and radio controllers can be used so that the computer can be connected to the robot easily.

Also, robot buyers will expect the same support that they would get if they bought a computer. A person should be able to view the robot at a retail store, understand its features, and have full repair and maintenance service available to him. It's too early now for a retail store to survive selling just robots, but as mail order companies and specialty stores begin bringing small robots into the public eye, some retail stores will begin opening and will begin establishing a much more solid market, perhaps as soon as 1988.

If the industry grows large enough to support retail chains and manufacturers, larger companies in related businesses such as Apple, Commodore, and even IBM might introduce small, non-industrial robots in the early 1990s to serve the growing needs of the public. This type of research and development, coupled with advancements in the marketing of this unusual new technology, will give the field an excellent chance to grow and be an important part of our lives.

Finally, before robots became popular, people will have to understand what robots can and cannot do. This education can be provided through magazine articles, retail store sales help, and advertisements which describe robots realistically.

However, people involved in the robot business should not repeat their past mistake of blaming customers for not accepting the products available. An important rule of marketing is to find out what the public wants and shape the product around those desires. In the past, companies introduced robots with barely any market research and became furious that consumers were too "stupid" to appreciate the work they had put into it. If anyone is interested is making money in any field, they must adopt their products to what people want, not try to change the public's attitude so that it accepts an inferior good.

From what I've learned from my magazine, the store, and Valley Robotics, most people interested in robots want a self-contained servant which is educational, useful in at least one way, and has enough personality so that it can fit into the family environment. Just as many people see their cars as an extension of their personality (the ambitious, aggressive Ferrari owner; the sensible, conservative station wagon owner), robots will become much more "part of the family," and after reaching a certain level of animation and personality, different types of robots will be customized for different types of families.

As for my own experiences in this small industry, the lessons I have learned from my own mistakes have been invaluable. An important part of entrepreneurship, particularly in the Silicon Valley, is persistence. By being in this area and reading about other people in science, business, or scholarly fields, I quickly discovered that lost time, lost money, and frustrations are all part of trying to succeed. Valley Robotics is helping me pay for my college education and is teaching me a tremendous amount away from school.

Whether the business of small robots will ever be significant is uncertain. However, the people in the field trying to make it happen have made a lot of progress so far, and their presence in this valley, the world's center of high technology, gives the industry an excellent fighting chance. ●

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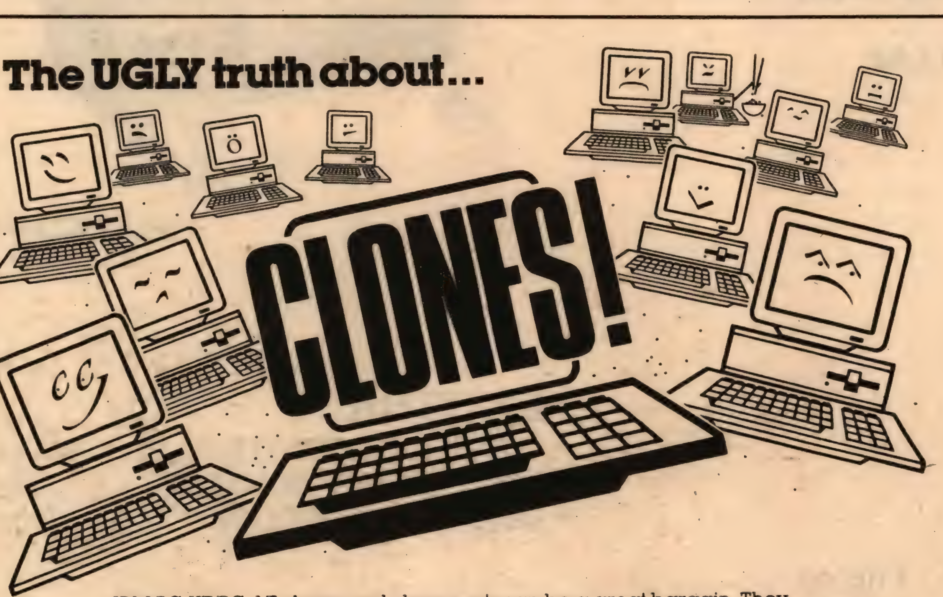

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Microsoft Suppliers Form Desktop Publishing Alliance

Three leading suppliers of desktop publishing solutions—Aldus Corporation, Hewlett-Packard Company and Microsoft Corp.—has announced the formation of a desktop publishing alliance to market their products as a complete desktop publishing solution.

The Aldus/HP/Microsoft alliance will develop and market a desktop publishing system comprised of new and existing products from each company. Together, the companies plan to spend more than $2 million on marketing activities aimed at promoting the cooperative solution.

MICROSOFT
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PageMaker

The system will include:

- Aldus' PC version of PageMaker desktop publishing software; and
- HP's LaserJet printer family; HP's Vectra AT-class personal computer; and HP's LaserJet Publisher kit, a new PC board that enhances the capabilities of the LaserJet family with IMAGEN Corporation's document description language;
- Microsoft Windows graphics operating environment and Microsoft Word word processing software.

Companies Jointly Promote and Develop Solution

Aldus, HP and Microsoft are working together to provide software support in their products to help optimize them as a single desktop publishing solution. Specialized fonts and printer drivers are being jointly developed, along with a common scanner file format for graphic scanners.

The three-company alliance expects to play an increasingly significant role in the emerging desktop publishing market. Each of the companies brings to the alliance technical expertise, a focus on customer needs and experienced customer support services.

Paul Brainerd, Aldus president and founder, said, "This alliance, coupled with our recently announced PC version of PageMaker, will help us to leverage our current desktop publishing leadership into the MS-DOS world."

"Each of the three companies in the alliance has substantial leadership in the desktop publishing market," said John L. Doyle, HP executive vice president. "Through cooperation, we plan to accelerate demand for MS-DOS-based desktop publishing solutions by offering a high-quality solution backed by superior customer service and support."

Added Bill Gates, chairman and founder of Microsoft: "Microsoft Windows provides the optimal graphics environment for desktop publishing in the MS-DOS world. This alliance provides us with an effective means of communicating the benefits of desktop publishing to business users."

U.S. List Prices and Availability

Aldus' PC version of PageMaker is $695. The HP LaserJet Plus printer is priced at $3,995; the new HP LaserJet Publisher kit will be priced at less than $2,500. The Microsoft Windows environment and Microsoft Word word processing package are priced at $99 and $450, respectively. All prices are manufacturer's U.S. list prices.

The PC version of Aldus' PageMaker will ship later this year; the LaserJet Publisher kit will ship in the first quarter of 1987; the balance of the products are currently available.

Aldus Corporation develops, markets and supports desktop publishing software for microcomputers.

Microsoft Corporation (NASDAQ "MSFT") develops, markets and supports a wide range of software for business and professional use, including operating systems, languages and applications programs, as well as hardware and books for the microcomputer marketplace.

For more information contact Aldus Corporation, 411 First Avenue South, Suite 200, Seattle, Washington 98104, 206-622-5500. Hewlett-Packard, Boise Division, 11311 Chinden Boulevard, Boise, Idaho 83714, 208-323-6000. Microsoft Corporation, 16011 NE 36th Way, Redmond, Washington 98073, 206-882-8080. ●

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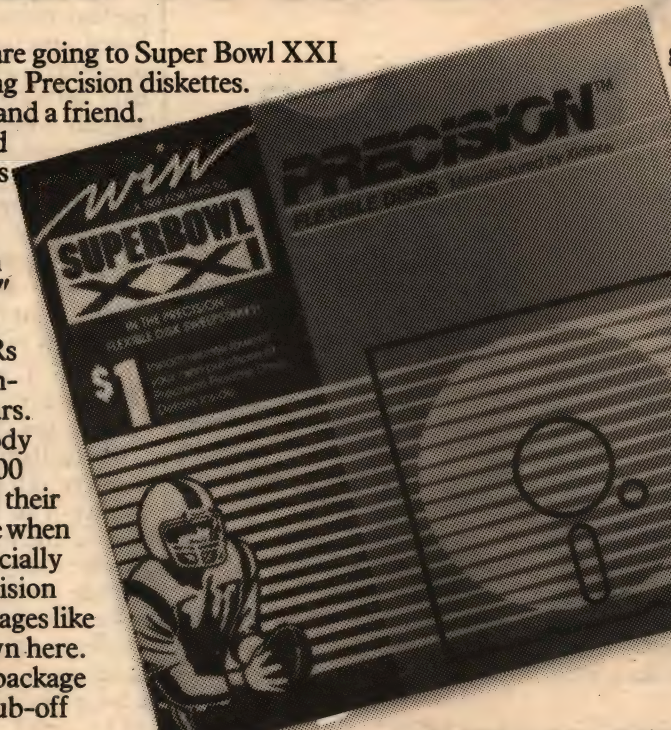

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New Life For An Old Printer

by Randall Staponski

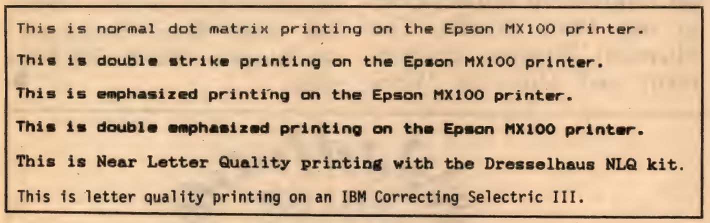
My trustworthy but aging Epson MX100 dot matrix printer has served me well for almost four years now. I bought it when dot matrix printers were simply plain old dot matrix printers. That is, near letter quality (NLQ) printing was not an available option. I initially printed a lot of graphics (and still do) with only an occasional formal letter. Unfortunately, my use of formal letters has increased to the point of being frequent while my budget has stayed the same. So when a plug-in NLQ board was offered for my printer, I took the plunge.

The MX, JX, and RX series of printers as well as the FX80 and FX100 printers from Epson did not provide NLQ printing. Recently, however, Epson has begun marketing through its distributors a plug-in board for its FX80 and FX100 printers to provide this function. Unfortunately the MX series was not included. Dresselhaus Computer Products is the only company I know that makes a plug-in board for the MX printers as well as the JX, RX, and FX printers. The board which I bought for my MX100 is similar to but not compatible with boards for the other printers.

A 19-page booklet is included with the board from Dresselhaus. The first 8 pages contain detailed installation procedures and the last 11 pages consists of operating instructions. Overall, the instructions are clear and well written.

The plug-in board measures about 1 5/8 inches square and holds 3 integrated circuits. All three ICs mount to the plug-in board. Twenty-four pins extend beneath the board and plug directly into a socket on the PC board. The paper separator, tractor feed mechanism (if present), and case must be removed for installation of the NLQ board.

The board replaces three socketed ICs in the printer. Not all of the sockets may be occupied. Only one of the three sockets in my printer had an IC in it. Photographs included with the instructions and IC socket identifiers on the PC board clearly show which ICs must be removed and also shows which socket the plug-in board is to be installed.



This is normal dot matrix printing on the Epson MX100 printer.

This is double strike printing on the Epson MX100 printer.

This is emphasized printing on the Epson MX100 printer.

This is double emphasized printing on the Epson MX100 printer.

This is Near Letter Quality printing with the Dresselhaus NLQ kit.

This is letter quality printing on an IBM Correcting Selectric III.

A pin guide in the socket must also be removed. I forgot to do this which resulted in a very loose fit. However the "common installation errors" section of the instructions identified my problem without too much frustration.

One jumper must be cut which makes the installation semi-permanent. It could also be a source of frustration if the board does not work and you wish to return the printer to its original state.

Also, one connection must be made between the plug-in board and a resistor on the PC board. No soldering is necessary. A lead comes out of the plug-in board to which a spring hook gripper is already attached. Pressing the top of the gripper exposes the gripper which can then be connected to the resistor lead. Although simple and easy it is possible this connection could become intermittent especially if the printer is often moved.

The plug-in board causes several of the dip switches inside the printer to be redefined. These should be set as shown in the instructions.

I use my printer with a North Star Advantage which is currently configured with a serial printer port. When I originally bought my printer, I installed an internal buffered (8K) serial interface made by Practical Peripherals. The NLQ plug-in board physically mounts beneath the interface board. This means the NLQ plug-in board and the internal serial interface can be used in the same printer with no modifications. However, the serial interface must be removed during installation. The entire installation procedure took about 45 minutes. This includes finding and correcting my installation error as well as removing and reinstalling my serial interface board.

Operation of the printer is almost the same as before. New commands are available by pressing the panel buttons in the proper sequence or by sending the proper commands via software. For example, the NLQ mode is selected by tapping the FF button while the printer is on-line. It may also be selected by sending the appropriate software control characters which in BASIC would be CHR$(27),"x1." The LF and FF buttons perform their normal functions of line feed and form feed when the printer is off line.

Other print modes such as compressed printing and emphasized printing can also be selected from the printer panel. The print mode can be changed whenever the printer is not printing by using the panel buttons. This makes it possible to change the print style several times in a single document. Depending on the software used, it might be just as easy to embed the appropriate printer control codes in the document before it is sent to the printer.

Other features include clear buffer and the addition of the IBM graphics set. I do not have an IBM or compatible and was unable to fully test the graphics feature.

The MX100 has a normal print speed of 80 characters per second. The NLQ mode requires two one way passes. That is, if the first pass is from left to right, the print head must return (without printing anything) to the left margin before beginning the second pass. This, combined with line feeds reduces the throughput to a range of 18 to 20 characters per second.

In my opinion, the most important factor in judging the board is the quality of the NLQ print. Figure 1 shows the standard dot matrix print from the MX100 followed by double strike, emphasized, double emphasized, and NLQ. The last line was typed on an IBM Selectric III typewriter. The NLQ print is a vast improvement over the standard dot matrix print but, as the name implies, is not letter quality.

So far I have been quite pleased with my Dresselhaus NLQ board. The $80 price tag is substantially less than buying a lower priced letter quality printer. This is especially true if you include the price of another cable, a switch to change printers, and a dust cover. If you have an older Epson dot matrix printer and your needs do not absolutely require a letter quality printer, then a NLQ board deserves a close look.

Product: NLQ plug-in board kit, Dresselhaus Computer Products, 837 East Alosta Avenue, Glendora, CA 91740, 800-368-7737 outside California, 800-831-9772 in California, $79.95 plus $1.50 shipping. ●

Bernoulli Box
A Report On Its Long Term Use

by Ron Richardson

Before the Bernoulli Box, there were two types of data storage systems, the floppy disk drive and the hard disk drive.

Floppy Disk Drives

As the name implies, the floppy disk drive uses a flexible disk. Because the magnetic material rubs against the jacket, its speed must be limited to under about 300 revolutions per minute. Since data transfer rates are directly proportional to rotation speed, this low speed slows down data transfer. The storage capacity of the floppy disk can be increased by "packing" the data close together, but as the data is packed closer together more sensitive and delicate disk drives are required. These two factors place an upper limit on the amount of data that can be packed on a floppy disk. Floppy disks do have the advantages of being both cheap and interchangeable.

Hard Disk Drives

As the name implies, the hard disk drive uses a rigid disk. Because the disk is hard and is not removed (which makes precise alignment difficult), the hard disk can be spun much faster—typically at over 3,000 revolutions per minute. This makes the hard disk much faster. Because of the rigid construction, the read/write head can be placed closer to the disk. This allows data to be packed much tighter, increasing the storage capacity. But having the head closer to the disk greatly increases the chances of the head touching (crashing) the disk. Since a typical head is only 25-50 micro-inches from the disk, the hard disk system is sensitive to dirt, cigarette smoke, and shock. As you can imagine, a piece of dirt looks like a bolder in this environment. The heads proximity to the disk also increases the probability of damage if the disk drive is bumped.

Bernoulli Box

The idea behind the Bernoulli Box was to use the advantages of each type of drive while avoiding their drawbacks. It uses an eight inch floppy disk encased in a rigid plastic shell, similar to the 3.5 inch Macintosh disks. The cartridge automatically opens when inserted in the Bernoulli Box and automatically closes when removed, just like a VCR cartridge.

The Bernoulli Box drive uses a single head placed underneath the cartridge. The spinning disk generates negative pressure (a principle discovered by 18th century mathematician Daniel Bernoulli—hence the name Bernoulli Box) which causes the disk to "fly" at a predetermined distance above the head. Any disturbance upsets the negative pressure and causes the distance between the disk and head to increase. This makes it almost crash proof although data read/write errors will occur. This stability allows the head to be placed very close (7 micro-inches) to the disk. This makes data transfer very fast.

The box itself looks a lot like an IBM PC, down to its color. It is slightly larger than the PC. You can place the box underneath the PC or beside it. It can be used standing vertically or horizontally. Soon after purchasing the Bernoulli Boxes, I took one in for service because the drive had been mounted slightly crooked. I watched as they took it apart to adjust the drive placement. The box is packed full of com-

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IBM's PDS: The Joymouse!

by Hal Nieburg

Joystick Becomes a Mouse for $19

What a joy to transform a joystick into a mouse. Better, into a new creature, a Joymouse!

I have always thought: "Wouldn't it be nice to use a joystick as if it were a mouse?" It would have so many advantages! It is cheaper to buy. Decent joysticks can be had for about $20; while even the cheapest mouse goes for at least $100, and really good ones far more. And I already have one that the kids use to play games.

Think of the other advantages. Finger-tip control, movements within fractions of an inch sufficient to move the cursor in any direction, all over the screen. Very little desk space is required. The fingers can touch the lever only inches away from the keyboard and tiny movements are amplified to full screen movements. And it can be put into service for all kinds of programs, whether they provide for mouse control or not!

Lo, and behold! IBM's Personally Developed Software (Call 1-800-IBM-PCSW, toll free) has made the thought come true! For only $19. Joymouse allows a joystick, connected to an IBM Game control Adapter, to be used as an alternate keyboard.

Once made memory-resident, Joymouse can be used for a wide variety of functions. Keep the joystick at the left of the keyboard. Now one finger can glide effortlessly between function keys and Joymouse, accelerating in a delightful manner all cursor movements in any software application, placing and selecting options from popup/down menus, moving and sizing windows to your pleasure, drawing curves, circles, free-form shapes of any kind directly to the screen.

Joymouse is like a disembodied mouse that can do subtle gymnastics in a space environment whose miniature dimensions are encompassed by the tiny steps of the fingertips. The whole program occupies only 9K of RAM and, from my experiments, does not interfere with a wide bunch of memory-resident utilities, such as Turbo Lightning, Sidekick, and PCtools.

In addition to cursor and highlight bar movements, the three joystick keys (1, 2, and 3, both together) can be programmed for any keyboard functions, maximizing convenience and avoiding key assignments that might conflict with favorite applications software.

Personally Developed Software?

At a time when it is fashionable to criticize Big Blue, let us say a good word about this innovative and bold marketing plan. IBM demonstrated great statesmanship when its first PC introduced the concept of "standardized and open architecture." A vast stream of new products (both hardware and software) flowed from this wise initiative. Without IBM's act, the use of personal computers would still be trapped in a Balkanized jungle of proprietary barriers.

Many IBMers were put to work in all phases of PC design, development, and use, both for software and hardware. Software developers were left free to play at the keyboards without any specific mission assignment, to roam and enlarge themselves to their hearts' content, going wherever the creative breeze might carry.

How can a big and famous corporation retain the personal touch and avoid the perils of size? By offering its employees the recognition and rewards that can come from company promotion and marketing of the kind of small software packages that must come from solitary and playful individuals, not from huge team efforts! That is the basis of Personally Developed Software (PDS).

IBM realized that the world of the micro was to be different from that of mainframes, and sought to learn something about the environment by helping it to flourish under its own roofs. From the beginning, IBM maintained several "internal" remote bulletin boards where employees can exchange information regarding their own voluntary beta-testing of IBM and personal products, as well as exchanging information and, like any "public domain" bulletin board, up-and-downloading each other's software efforts.

Fulltime employees were assigned to do nothing but act as sysops and librarians for the networks, without any mandate about generating marketable products down the line. Under a liberal, low-pressure policy of company sponsorship, the whole new universe of the personal computer was cultivated and explored inhouse. In effect, within IBM there developed a whole PC user community, which IBM had the foresight and wisdom to sponsor and support.

IBM publishes an attractive give-away catalog, updated frequently. It can be had by calling the toll free number, or by writing P.O. Box 3280, Wallingford, CT, 06494. The 1987 edition came out in October, listing over 100 software packages, including 20 new ones (of which Joymouse is one), with prices beginning at $10 and most products priced below $30.

PDS includes offerings in the areas of productivity, programming, business, communications, lifestyle, education, science, statistics, engineering, and entertainment. Already low prices are made more attractive by combination offers: "Order three, Get One FREE!" And also receive a free 17"x22" full-color poster for the Rec-Room.

Some of the releases in the new catalog: Browstext, DB Editor, Justedit, Lite Editor (an outliner), Correspondence Manager, Print Buffer, Short Hand, Slide Maker, Statlib 1&2, Programmed Evaluation of Contract Option Strategies, Network Remote Control, Structure BASIC, Morse Code Drills, Fortran Tutor, and on and on.

Included is one of the best new games to appear anywhere, Alleycat, $24.95. Help Freddy overcome obstacles to reach his sweetheart Felicia! A deceptively simple game, but almost as full of surprises and challenges as Chess or Flight Simulator. We begin with Freddy crossing in front of a fence lined with garbage cans. He can jump from can to can, providing a mean cat doesn't stick his head out of a can, and from the cans to the fence.

If he is too slow, a bulldog attacks him on the ground and a furious ball of fur results. Once on the fence, he can jump from clothes line to

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Bernoulli

continued from page 272

ponents with no room to spare. The electronics looked much more complex than the electronics inside the computer, although that is hard to judge by looks.

Statistics

The Bernoulli Box is faster than a standard IBM XT hard disk. Using COPY *.*, it transferred data at over 20K per second. The Bernoulli Box comes with its own disk copying routine (DISKCOPY does not work). Using this, it takes about three minutes to copy a 10 Meg cartridge, regardless of the amount of data on the cartridge. The resulting copy is fully functional. When using the cartridge to backup a hard disk using PC DOS BACKUP.-COM, data is transferred at over 11K per second. So backing up a 10 Meg hard disk takes about a little over fifteen minutes.

Setup

You remove the computer cover. Then you install a short card. Next you replace the cover. Finally you connect the computer and Bernoulli Box with a single cable and plug in the Bernoulli Box. The Bernoulli Box has a nice feature, a switched AC plug on the back to plug the computer into. That way, turning on the Bernoulli Box turns the computer on. It comes with one of two cards, the standard card cannot be used to boot the computer. It requires a device driver in the boot CONFIG.SYS. The $168 optional card allows the computer to boot off the Bernoulli Box.

Formatting a cartridge is a three step process. You first do low level formatting with the supplied routine. You then run FDISK.COM. Finally you use the PC DOS FORMAT.COM program. I find it quicker and easier to keep an extra formatted cartridge around and use the cartridge copy routine to "copy the formatting" to a new cartridge.

The Bernoulli Box comes in several configurations. Single and dual 10 Meg drives (the single drive uses the case for the dual drive), single and dual 5 Meg drives (for the Mac) and a dual 20 Meg drive. They are also available combined with a standard hard disk.

Every Day Use

The single drive systems are useful only as a very expensive tape drive to back up a hard disk. This is because the cartridge copy routine requires two cartridges to copy. The dual drive systems can be used in two ways. The first is with one drive as a system drive and the other as a data drive. The second is using one drive to produce a backup on the other drive. Since this only takes three minutes, there is no excuse for not making daily backups.

We have all the departmental software installed on one disk drive. The users are not allowed to install programs or store data on these drives. The other drive is for the users to store data and custom programs. Since the cartridges can be removed and locked up, using them to store sensitive data is easy.

We have two computers that are used about twelve hours per day. We have had the Bernoulli Boxes for twenty months, so the systems cartridges have been in use for over 4,800 hours. The ten data cartridges are used daily but a lot less than the system cartridges. In this time we have only had one cartridge failure and that was painless since we had a backup. Well almost painless since the cartridges cost us $62 with a discount because our company does a lot of business with the supplier. If you have two disks in the machine, it will spin down the first one used after several minutes of inactivity. However, one disk is always spinning.

After using the Bernoulli Boxes for twenty months, I have nothing but praise for them. They are fast. They offer the fastest backup I know of. And they are rugged.

Problems

I have only two problems with the Bernoulli Box. First, the software that comes with it to format and copy cartridges can only be used through a menu. This makes it impossible to build batch files to automate these processes for inexperienced users. Second, they cost a lot. When we purchased ours twenty months ago, they were a little over $4,000. They currently cost about $2,000 mail order. This will purchase four 20 Meg hard disks. An additional, and unavoidable, problem is caused by DOS. When you change disks, DOS does not read the new directory unless you force it to. So when changing disk, you must change to the root directory and do control [^C].

Conclusion

The Bernoulli Box offers users more storage capacity, data security, an ease of backup than any other mass storage method. If you can get past the steep purchase price, the Bernoulli Box offers an excellent value.

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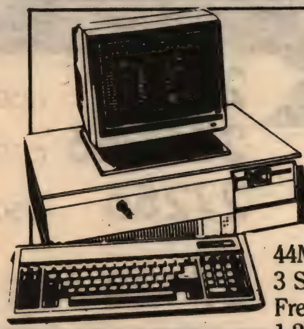

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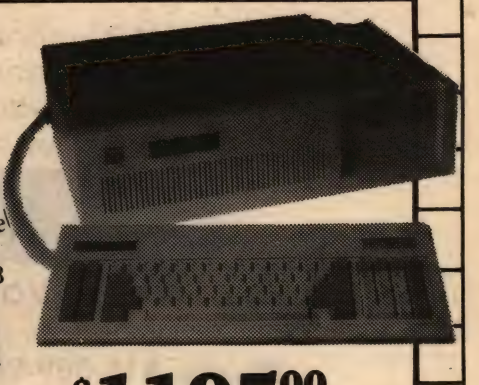

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* Over 95% of this ad has been type-set & printed using the LePrint software and a Citizen MSP-10 printer on the a286. (Copy was reduced slightly)

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A Real Chinese Copy!

by Stan Veit

The People's Republic of China has been making every effort to catch-up with the Western world in all areas of technological advancement. They have developed space capabilities and now they are trying to enter the world of PCs by making their own PC clones just as their former countrymen in Taiwan are doing.

The Great Wall 0520C is a PC clone with an 8088 CPU and 512K of RAM. It has five expansion slots and comes with two RS-232C serial ports and a printer port. Additional built-ins include a real time clock and floppy disk controller for two 360K floppies. The front panel features a LED display of memory utilization and I/O port access.

A popular feature in the Chinese language world is an optional Chinese language card which can produce 28 by 40 Chinese characters on the color monitor. The Chinese system must run under the GWBIOS developed in China by Great Wall Microcomputer Development Corp.

The new GW0530 is an AT clone using the 80286 CPU operating at 5Mhz or 8Mhz. It has either 640K or 1 Mbyte of RAM on board with a maximum memory expasion size of 15 Mbytes.

The 0530 is equipped with disk controllers for two 1.2 Mbyte floppies or two 360Kbyte floppies. It also has either two 20 Mbyte, or one 40 Mbyte hard disk.

The Great Wall computers are conventional clones and appear to be as well built as any of the similar clones built in the Far East. They are built by the China Computer Development Corporation in Beijung, China and distributed by TRC Technology Research Co. in Hong Kong. While the Chinese computers were shown at Comdex 1986, there is some question of them ever being imported into the United States. ●

IBM's PDS
continued from page 274

clothes line trying to nail a frolicsome group of mice, or they can sneak up on him and he falls off. Windows open on a nearby apartment building, some of which he can enter for new challenges (actually, each window is a new game in its own right), or a boot may come flying out at him. So many dangers and opportunities! A game that will continue to arrest and astonish even an adult player for many hours, beautifully animated and full of surprises.

Back To Joymouse

Joymouse has been kicking around on internal IBM BBSs for several years and many insiders have been delighted to have this rare utility for converting a joystick into a mouse. The author is Donald K. Roy, and the notion is brilliant in its simplicity. It may convert many longtime mouse-holdouts, like me. I now have installed the utility in my AUTOEXEC.BAT file and use it for virtually every program.

When you move the joystick, Joymouse moves the cursor as though you were pressing cursor movement keys, except that the cursor flies like an airy disembodied spirit, doing your work effortlessly in a flash. Cursor movements with the Joymouse are vernier controlled. That is, speed of movement increases logarithmically as the stick is bent from the neutral position. Maximum speed is set at bootup, from 1 to 9, and one learns to move slowly or swiftly to the end of a word or to a command icon.

With a word processor, I use the joystick in conjuction with the regular keyboard, sometimes using cursor arrow keys but, for giant leaps over text, or for marking large blocks, I rely on Joymouse. With Framework, I find it useful for moving different windows around, for selecting files from directories, for accessing popdown menus, and for moving among cells or fast scrolling in large spreadsheets.

In Lotus 123 or Symphony, it will perform just as well. In programs designed for a mouse, the joystick does splendid service. I experimented with Microsoft word, which is clumsy and slow from the ordinary keyboard, and discovered what the programmers really had in mind. With Clickart, Gem Draw, and Microsoft Windows, the Joymouse adds stunning power and convenience, like flying a jet fighter within the confines of a drawing board or over the text terrain of a document.

Assigning Joymouse Button Values: joystick buttons can be set to any of the keyboard keys. For example, button 1 can be assigned to the PgDn key, button 2 to PgUp, and by pressing the two buttons at the same time, you can assign "button 3" to the Spacebar. To assign the three buttons, just enter:

```
C>joymouse /1=pgdn
/2=pgup /3=spacebar
```

The following is a list of the names of the various keys that you can assign to the three buttons. S-means Shift, A-means Alt, and C-means Ctrl.

```
Home       C-Home  Tab  S-Tab
End        C-End   Pad+ Pad-
PgUp       C-PgUp  Del  Enter
PgDn       C-PgDn  Ins  C-PrtS
C-Left     C-Right Esc  Spaceb
Backspace          C-Backspace
a to z     A to Z
0 to 9     F1 to F10
C-A to C-Z C-F1 to C-F10
A-a to A-z A-F1 to A-F10
A-0 to A-9 S-F1 to S-F10
```

You can change the cursor speed by choosing a value from 1 to 9. One is slowest and 9 the fastest. The horizontal and vertical cursor speed can be set independently. To change the horizontal speed to five and the vertical speed to 3, enter: `joymouse /h=5 /v=3`. If you do not want to set your own values the program automatically sets them for you. Joymouse can be turned on/off, while remaining resident in memory.

The utility is designed to be used in a batch file (see your DOS manual if you are unfamiliar with batch files). This is done by allowing all the functions to be started from parameters on the command line rather than having a menu.

Joymouse is a joy! It may be the way to finally convert all those mouse-holdouts, such as I was, to the use of an auxiliary way of addressing the screen. It is cheaper, faster, and more convenient than most mice, requires less hardware and space to install and operate, and makes navigating the screen as effortless as traveling in the imagination. I am happy to salute Donald Roy and the tender giant, IBM, that so lovingly pays people to play at their keyboards, and then so agreeably markets the offspring to the general public.

PDS indeed is a sheltered cove of small wonders, which only a sensitive giant had the good sense to protect from its own bigness. The catalog gives credit to the individual programmers, printing their names and pictures along with the product descriptions and sample screens. All the disks include adequate documentation. Unlike Apple, IBM seems to know how to handle success, and has found a way to keep all its Steve Jobs and Wozniaks in the family, without dampening their creativity. ●

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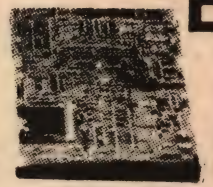

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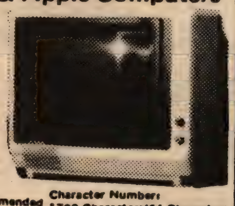
for Atari, Commodore & Apple Computers
Model: Color-I Plus -
Resolution: 260Hx320V
Only 250 Available;

$129.95



Input Terminal:
Video in: RCA phone-jack
Audio in: Mini earphone jack
15½Hx17½Wx15½D"
Recommended Display
Character Number: 1700 Characters(64 Characters x25 Rows on 5x7 Dot Matrix)

MOTOROLA 7" DIAGONAL SCREEN HIGH RESOLUTION GREEN SCREEN MONITOR

NEW! IN BOX

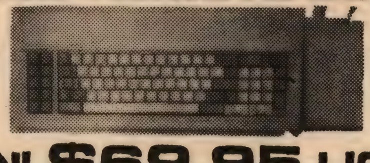
$280.00 Factory List
$29.95 4 for $99.00
MODEL MD1700

- Flat Faceplate
- 900 lines at Center 650 lines at corners.
- Operates from 12VDC at 1 Amp.
- Vertical input is 47 to 63 Hz.
- Horizontal input: 15.7 Khz (18.7 Khz optional)
- Video input signal: Positive white, input termination 470 ohms ± 5%, 2.5V to 5.0V P-P

Weight: 6lbs.
For split video (TTL Inputs) operation. Not composite video.
22 MHZ TYPICAL BANDWIDTH

INFRARED REMOTE CONTROL

IBM PC/XT (OR JR.)



KEY BOARD

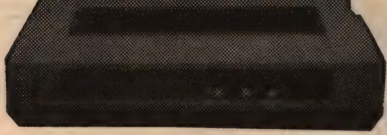
LIQUIDATION! $69.95 LIQUIDATION!

We are proud that we have been awarded the opportunity of offering these very unique keyboards. The original factory list was 259.00. We are blowing them out at an incredible price! Also, these are American made and not Taiwan clones. These can be operated by remote or attached to your computer.

COMPLETELY IBM COMPATIBLE

TEC MODEL 1550 PRINTER $279.00

- Centronics parallel and RS232 Serial ports
- 15" carriage
- 120 cps
- Tractor and friction feed
- Graphics



One of the largest manufacturers in the world has 125 of these prestigious printers in their overstock. We are extremely fortunate to be designated as their representative to market them.

ASTEC 65 WATT SWITCHING POWER SUPPLY

SUPER DEAL!

Dual input voltage 115/230 VAC - Overvoltage protection - Short circuit protection - Dual isolated +12V - Built-in EMI filter - Very compact size -,UL/CSA/VDE approved - 100% thermal cycle & burn-in - High efficiency - Vaccum impregnated transformers - Convection cooling - Open PCB "L" bracket or boxed construction.

Dimensions;
8.0" - Length
4.4" - Width
2.4" - Height

SUPER DEAL! $29.00

OUTPUTS:

Condition No.1	Condition No.2
+ 5V DC@ 6.0A	+5V DC@ 5.0A(with two + 12V outputs in parallel)
+12V DC@ 1.5A	+12V DC(with two + 12V outputs in parallel)
+12V DC@ 2.1A	@3.5A (5.0A surge)
−12V DC@ 0.25A	−12V DC@ 0.25A

MODEL No. AC9335-01

PERFECT FOR POWERING:
- HARD DISK DRIVES
- FLOPPY DISK DRIVES
- MINICOMPUTERS
- CRTs

PROGRAMMABLE SYNTHETIC SPEECH GENERATION BOARD

SSB—APPLE **$59.00**

PLUG COMPATIBLE WITH APPLE II MICROCOMPUTERS. Can be easily controlled by BASIC. Uses TMS5220 for: Low-data-rate LPC encoding. +5V & -5V supplies only - TTL Compatible

INCLUDES: Software and Speaker

EPSON QX-10

MOTHERBOARD WITH VIDEO CARD & YOUR CHOICE OF — ASCII KEYBOARD (ENCLOSED) OR HASCII (BARE)

$169.95

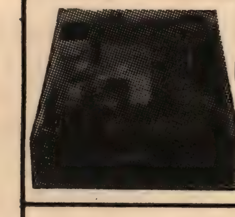
ONLY 250 SYSTEMS AVAILABLE!
Will work with any IBM compatible disk drive • CPU: μPD780AC-1 (Z80A compatible, 4 MHz) • Memory-RAM: 256K on board; Video RAM: 128K on CRT board; C-MOS RAM: 2K; EPROM: 2/4/8K (for IPL). Clock: C-MOS real-time clock. Interface: Serial and Parallel. DMA: 7 channels. Interrupt levels: 15; Counter/timer: 6 channels. Card slots: 5. Compatible with any TTL monitor. Weight: 10 lbs. with enclosed keyboard, 8 lbs. with bare keyboard.

KEPCO/TDK SWITCHING POWER SUPPLY

$39.95

ONLY 250 AVAILABLE!
Model EFX 100T-3 100W • +5V @ 8A • 5V @ 1.5A • + 12V @ 2.0A • 12V @ 2.0A • Input Voltage: 100 to 130Va-c or 200 to 260Va-c. 47-440 HZ. Single phase. • Brownout Voltage: 90Va-c/180Va-c • Fused Input/Output protected against short circuit. Dim: 9⅜"L x 4¹⁵⁄₁₆"W x 2⅛"H, Weight: 3 lbs., Spec Included.

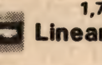
Kodak-Teammate



HIGH CAPACITY DISK **Drive $129.00**

Unformatted: 3.3 Mb Formatted: 2.78
Requires 8" controller and software (both available)
**Amlyn 1865 High Capacity drive : 119.00

"Spy in the Sky" Fairchild CCD122
1,728 ELEMENT *
Linear Image Sensor
$29.95

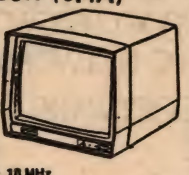


"The Twilight Zone"
Designed for page scanning applications including facsimile, (Optical Character recognition and other imaging applications which require high resolution and high sensitivity.

TANDON 848-2	199.95
REMEX FD480	59.95
RICOH RP1200 (Daisy Wheel)	349.95
SERIAL MODEM CABLE	7.95
NASHUA Diskettes (box of 10)	8.00
4164—15 (min. 100 pcs.)	.89
TELEPHONE HEADSET	3.95
12V ADAPTER (250mA)	2.50
ULTRASOUND DEVICE	3.95
5" MONITOR (B&W)	39.95

MODEL DM8112CX High Quality - Solid State 12" SANYO MONITOR

MONOCHROME- For use in: Surveillance, Industry, broadcast, education & data display.
AC 117V-60Hz-36W (0.4A)
Re-conditioned & fully tested - Composite video signal, sync. negative



$49.95

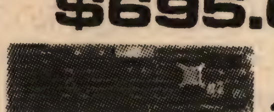
Video amp. bandwidth 18 MHz
Display format 1920 characters max. 80 char. x 24 lines (5 x 7 dot)
Scanning Frequency
Horizontal rate 15.78 KHz, Vertical rate 60 Hz
10½Hx13Wx14D"

CLASSIC TECHNOLOGY CORPORATION

286 SPEED PAK FOR IBM PC & XT

UP TO 10 TIMES PC SPEED

$695.00



10 MHz

- Increases speed of PC/XT to make it 33% faster than an AT
- 20—30% faster than boards that use cache
- Compatible with IBM Enhanced Graphics Adapter and the Lotus/Intel above board
- Can run programs designed for the AT's and also PC/XT's
- No software patches needed
- Includes native mode
- Made in U.S.A.

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Inquiry 361

Minimum Order: $25.00. Shipping & handling charges via UPS Ground: $.50c/lb. UPS Air: $1.00/lb. Minimum Charge: $4.00. We accept cashiers checks, MC or VISA. No personal check COD's. Items reflect 5% cash or check discount. California residents add 6½% sales tax. We are not responsible for typographical errors. All merchandise subject to prior sale. Phone orders welcome. Foreign Orders require special handling Prices subject to change without notice.

TECH PC TWIN MULTIUSER
Starting From $1699

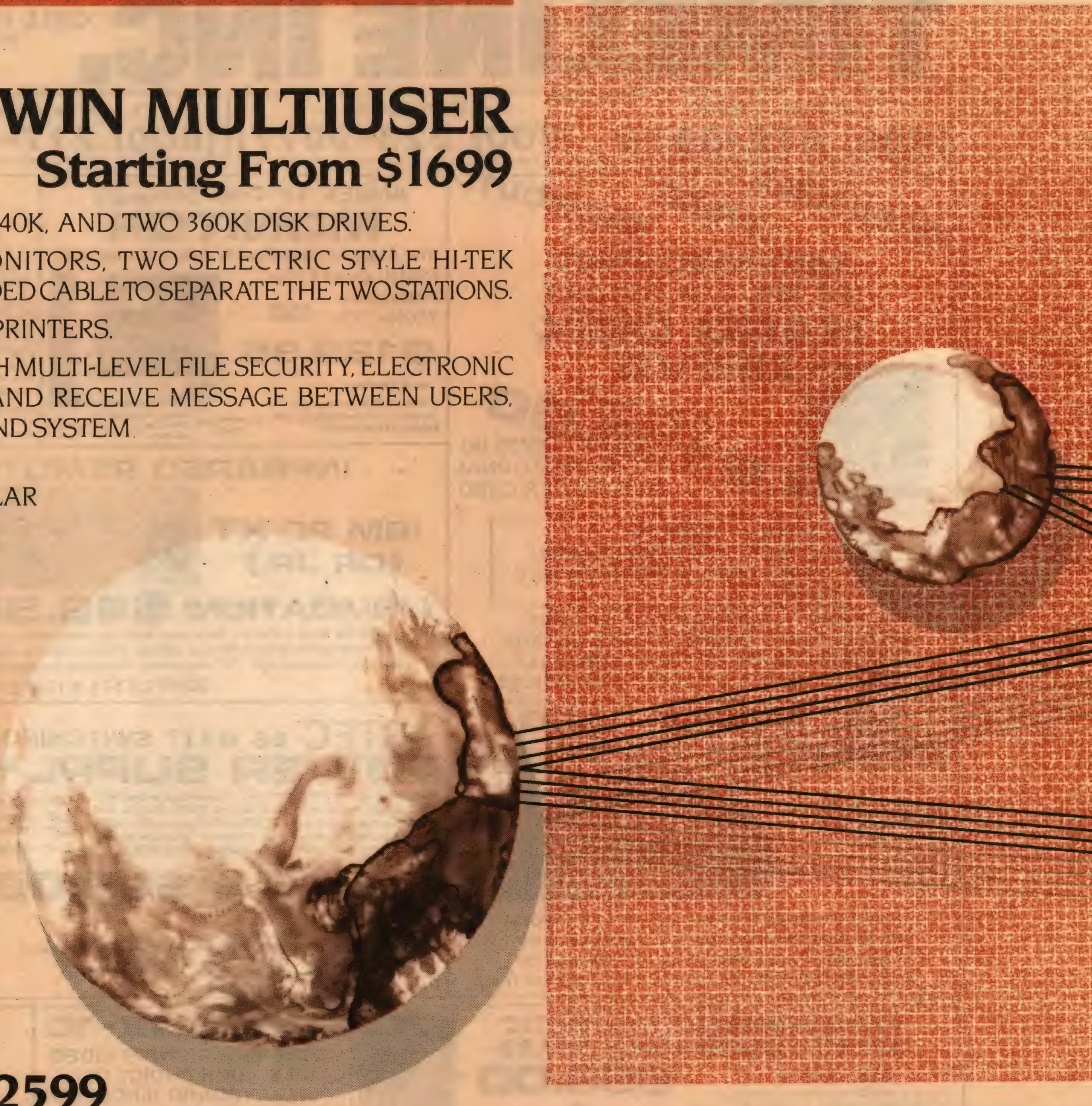
TECH PC/XT BASE UNIT WITH 640K, AND TWO 360K DISK DRIVES.

TWO HIGH RESOLUTION MONITORS, TWO SELECTRIC STYLE HI-TEK KEYBOARDS, 50 FEET OF SHIELDED CABLE TO SEPARATE THE TWO STATIONS.

SYSTEM SUPPORTS UP TO SIX PRINTERS.

FULL SOFTWARE SUPPORT WITH MULTI-LEVEL FILE SECURITY, ELECTRONIC MESSAGE FACILITY TO SEND AND RECEIVE MESSAGE BETWEEN USERS, PASSWORD LOGON SYSTEM, AND SYSTEM OPERATOR COMMAND LEVEL.

SYSTEM SUPPORTS ALL POPULAR SOFTWARE SUCH AS WORDSTAR, DBASEIII, LOTUS 123, MULTIMATE, ETC.



TECH PC TRIAD MULTIUSER
Starting From $2599

TECH PC/XT BASE UNIT WITH 640K, AND TWO 360K DISK DRIVES.

SEPARATE INTEL 80188 MICROPROCESSOR RUNNING AT 8 MHZ AND 512K FOR EACH TERMINAL.

THREE HIGH RESOLUTION MONITORS, THREE SELECTRIC STYLE HI-TEK KEYBOARDS, 50 FEET OF SHIELDED CABLE TO SEPARATE THE THREE STATIONS.

SYSTEM EXPANDABLE TO 32 WORKSTATIONS.

SYSTEM SUPPORTS UP TO SIX PRINTERS.

FULL SUPPORT FOR MULTITASKING MULTITERMINAL USE WITH PRINT SPOOLING FOR MULTIPLE PRINTERS, BACKGROUND MONITORING OF THE SYSTEM, DIAL UP BULLETIN BOARD SUPPORT, PASSWORD PROTECTION, AND FILE/RECORD LOCKING SUPPORTING PC NETWORK PROTOCOL.

SYSTEM SUPPORTS ALL POPULAR SOFTWARE SUCH AS WORDSTAR, DBASEIII, LOTUS 123, MULTIMATE, ETC.

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TECH PC **714/754-1170**

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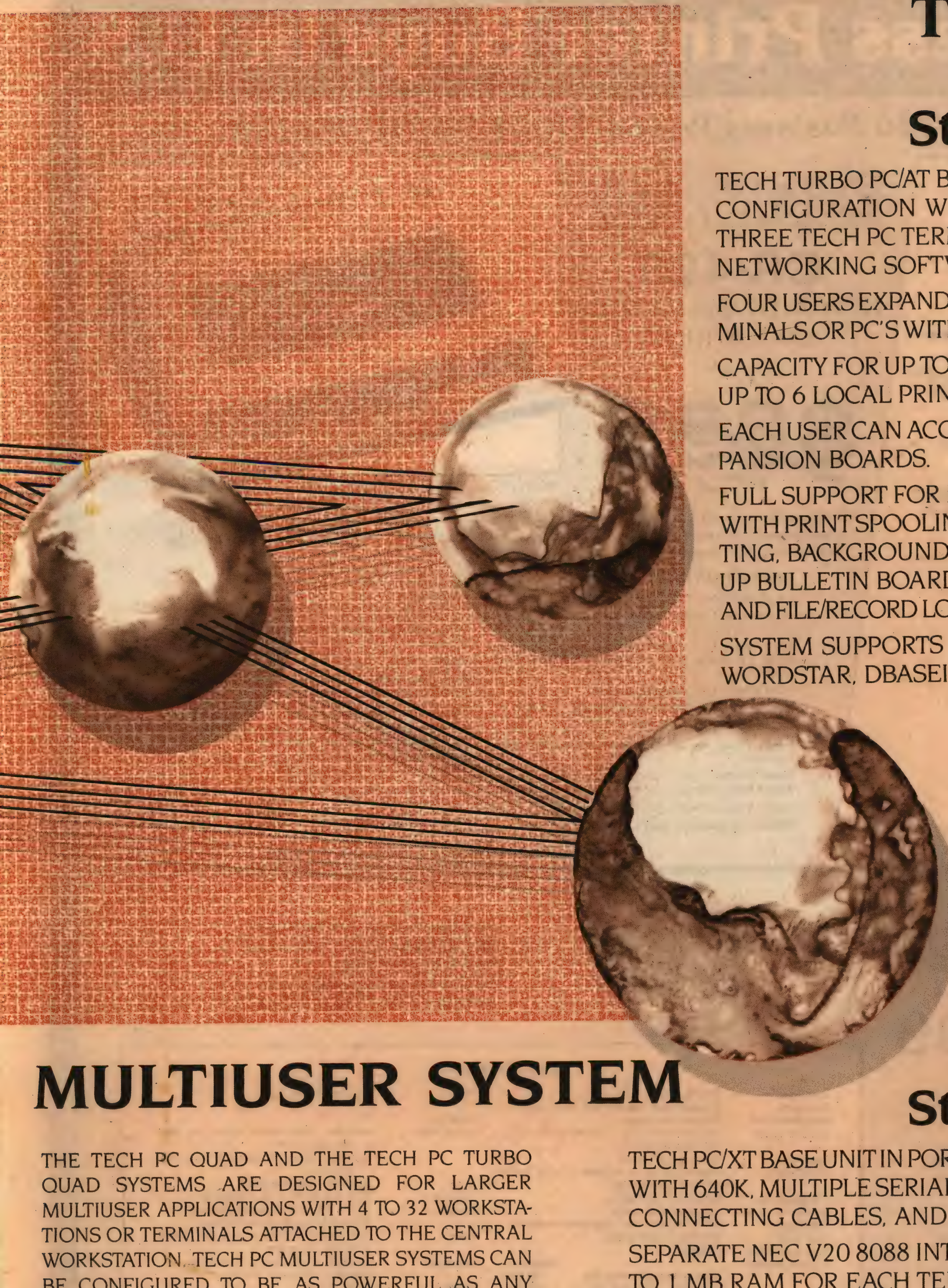
Telex 272006 Answer Back - TECH FAX: 71415568325

THE TECH PC

THE TECH PC MULTIUSER COMPUTER SYSTEMS ARE MULTISUER MS/PC-DOS BASED MULTIUSER SYSTEMS WITH PERIPHERAL WORKSTATIONS OR TERMINALS INTERFACED TO A CENTRAL WORKSTATION WHICH HAS SYSTEM DATAFILES, PROGRAMS, AND SUPPORT PERIPHERALS. THE FOUR DIFFERENT MULTISUER SYSTEMS VARY IN THEIR PROCESSING POWER, THE NUMBER OF TERMINALS THEY CAN SUPPORT, AND THE EASE WITH WHICH THEY CAN FULFILL ANY OF A WIDE VARIETY OF MULTIUSER APPLICATIONS. THE TECH PC TWIN AND THE TECH PC TRIAD MULTIUSER SYSTEMS ARE DESIGNED FOR THE SMALL BUSINESS OWNER WITH AN IMMEDIATE NEED FOR A SMALL MULTIUSER SYSTEM.

MULTIPLE

THIRD PARTY
AVAILABLE THROUGH



TECH PC QUAD MULTIUSER

Starting From $4499

TECH TURBO PC/AT BASE UNIT IN PORTABLE OR DESKTOP CONFIGURATION WITH 512K, MULTIPLE SERIAL PORTS, THREE TECH PC TERMINALS, CONNECTING CABLES, AND NETWORKING SOFTWARE.

FOUR USERS EXPANDABLE TO NINE USERS OVER DUMB TERMINALS OR PC'S WITH TERMINAL EMULATION SOFTWARE.

CAPACITY FOR UP TO 16 PRINTERS AT REMOTE SITES WITH UP TO 6 LOCAL PRINTERS ATTACHED TO THE MAIN UNIT.

EACH USER CAN ACCESS 512K OF RAM WITH MEMORY EXPANSION BOARDS.

FULL SUPPORT FOR MULTITASKING MULTITERMINAL USE WITH PRINT SPOOLING FOR CENTRAL OR TERMINAL PRINTING, BACKGROUND MONITORING OF THE SYSTEM, DIAL UP BULLETIN BOARD SUPPORT, PASSWORD PROTECTION, AND FILE/RECORD LOCKING USING PC NETWORK PROTOCOL.

SYSTEM SUPPORTS ALL POPULAR SOFTWARE SUCH AS WORDSTAR, DBASEIII, LOTUS 123, MULTIMATE, ETC.

TECH PC TURBO QUAD MULTIUSER

Starting From $5999

TECH PC/XT BASE UNIT IN PORTABLE OR DESKTOP CONFIGURATION WITH 640K, MULTIPLE SERIAL PORTS, THREE TECH PC TERMINALS, CONNECTING CABLES, AND NETWORKING SOFTWARE.

SEPARATE NEC V20 8088 INTEL COMPATIBLE 8 MHZ CPU AND UP TO 1 MB RAM FOR EACH TERMINAL ON THE SYSTEM.

TWO FULLY FUNCTIONAL SERIAL PORTS PER TERMINAL.

FOUR USERS EXPANDABLE TO 32 USERS OVER DUMB TERMINALS OR PC'S WITH TERMINAL EMULATION SOFTWARE. CAPACITY FOR UNLIMITED NUMBER OF LOCAL PRINTERS.

FULL SUPPORT FOR MULTITASKING MULTITERMINAL USE WITH PRINT SPOOLING FOR MULTIPLE PRINTERS, BACKGROUND MONITORING OF THE SYSTEM, DIAL UP BULLETIN BOARD SUPPORT, PASSWORD PROTECTION, AND FILE/RECORD LOCKING SUPPORTING PC NETWORK PROTOCOL.

SYSTEM SUPPORTS ALL POPULAR SOFTWARE SUCH AS WORDSTAR, DBASEIII, LOTUS 123, MULTIMATE, ETC.

MULTIUSER SYSTEM

THE TECH PC QUAD AND THE TECH PC TURBO QUAD SYSTEMS ARE DESIGNED FOR LARGER MULTIUSER APPLICATIONS WITH 4 TO 32 WORKSTATIONS OR TERMINALS ATTACHED TO THE CENTRAL WORKSTATION. TECH PC MULTIUSER SYSTEMS CAN BE CONFIGURED TO BE AS POWERFUL AS ANY MULTIUSER MINICOMPUTER SYSTEM, YET THEY WILL STILL RUN YOUR FAVORITE MS/PC DOS PACKAGES IN A MULTIUSER ENVIRONMENT.

CALL OR WRITE TECH PERSONAL COMPUTERS FOR MORE INFORMATION ON OUR FULL LINE OF DESKTOP, PORTABLE, MULTISUER, AND MINICOMPUTER SYSTEMS AND OUR FULL LINE OF COMPUTER SYSTEM ACCESSORIES.

CHOICE

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420 CPS COMREX CR-420 Business Printer MOVES MOUNTAINS

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Friends,

MidWest Micro has landed for you two of the best continuous duty, business quality printers anywhere. And the values absolutely cannot be beat! Through special arrangements we are able to offer a limited quantity of Comrex CR-4 daisywheel and CR-420 high speed dot matrix printers at unbelievable savings.

These printers are new in factory containers and come to you complete with manufacturers warranty.

Again this is a limited offer and will not be repeated. So call now and "Save with Confidence" to the tune of several hundreds of dollars.

We at MidWest Micro will continue to do our best for you. Thank you for your generous patronage.

Sincerely,

Mark L. Runkle
President

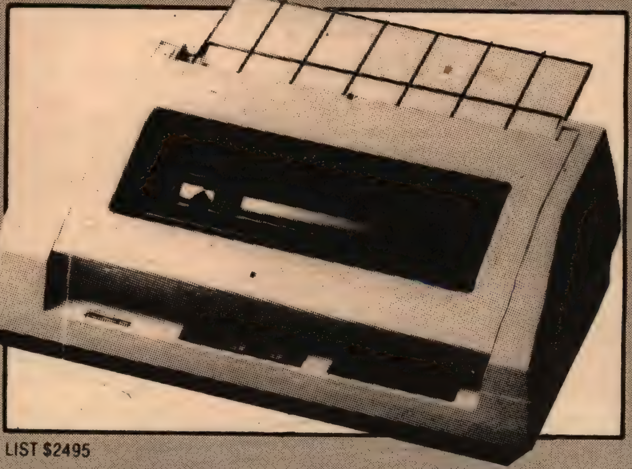
COMREX™

CR-420

NOW WITH IBM PRINTER EMULATION!

JUST

~~**$895**~~ *Even Less!*



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This stupendous brute of a printer will make short work of even your largest spreadsheets and reports. You will surprise yourself and amaze your friends and colleagues with this super printer performing in your office. Don't miss out on this one!

CR-420 Ribbon Cartridges $16.95 each
Call for Quantity Savings

SPECIFICATIONS

Carriage Width: 132 Columns (at 10 pitch)

Print Method: Impact dot matrix, bidirectional, logic seeking in both text and graphics

Print Speed: 420 CPS/Draft; 104 CPS/Correspondence Quality; 2500 dots/sec. – standard graphics; 1250 dots/sec – high-density graphics

Print Head: 8-pin, staggered arrangement

Character Sets: Standard 96 ASCII printing in 17 fonts

Line Spacing: n/180 (n=0-255)

Paper Feed: Pin feed (paper width adjustable) and built-in friction feed

Paper Width: 5" to 15" (pin feed); Up to 16" (feed)

Paper Path: Rear and bottom entry

Paper Thickness: Original plus 4 copies (5-part)

Ribbon: Cassette style, single color (black)

Interfaces: Parallel – Centronics-style; and Serial –RS232C Asynchronous

Baud Rate: 1200, 2400, 4800, 9600; switch selectable

Protocols: X-ON/X-OFF, READY/BUSY, ETX/ACK, switch selectable

Buffer: 18K

Reliability: MTBF – 800 hours continuous printing; MCBF – 200 million characters; MTTR – 30 minutes

Power: 117 VAC ± 10%, or; 220 VAC ± 10%, 50/60 H_z

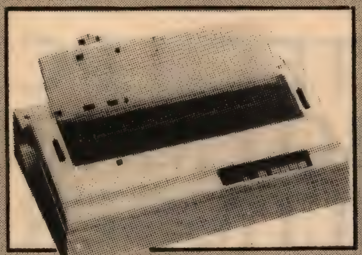
Power Consumption: 55W (Standby); 175W (Operating at self test print); 250W (Operating at heaviest duty)

Environmental Limits: Temperature (operating) 5°-40°C; 40°-105°F; Humidity (operating) 20-80%

Dimensions: 595mm (W) x 194mm (H) x 405mm (D); 23.4" (W) x 7.6" (H) x 15.9" (D)

Weight: 27kg; 60 lbs.

CR 420 Ribbon Cartridges $16.95



COMREX™

CR-4

Your Price Just

$399

Was $1995

2+ $369
3+ $349

- **Superior Performance**
- **Fast 36 CPS Print Speed**
- **7K Print Buffer**
- **Continuous Duty Cycle**
- **Wide 16-5" Paper Carriage**

This bidirectional, logic seeking marvel lets you adjust the hammer intensity to print anything from single-page letters to five-part forms with equal clarity. A variety of impressive typestyles give you added print versatility.

It is exceptional in many other ways. The 15½" wide carriage briskly prints all your ledgers, spreadsheets, and extra wide business graphics with ease. With the optional cut sheet feeder and tractor feeder, you can print several copies on your letterhead and switch to pin-fed paper for high volume word or data processing.

The 7K buffer holds a substantial amount of data while its printing.

The average life of the print wheel is 10 million characters. Which means that you can run it eight hours a day — every day of the week — for almost two full years. Of course, under more normal usage, it will handle your business correspondence and graphics for up to five full years without service. That's impressive.

Quiet quality.

What your eyes don't tell you, your ears will. Because this printer is much quieter than many more expensive printers. So you can keep the noise down while you keep the cost down.

Specifications

Print Speed	36 CPS (Shannon text)	
Print Wheel	96 petals/wheel, cassette type, ASCII stand.	
Print Wheel Life	10 million char./wheel	
Characters/Line	132 characters (1/10"), 158 characters (1/2"), 198 characters (1/15")	
Paper Width	16.5 in max (419 mm)	
Copy Capacity	Original (45 kg) + 4 copies (15 kg) (total thickness 0.35 mm max.)	
Carriage Motion	Bidirectional, logic seeking	
Carriage Rtrn Speed	750 ms (at 13.2" return)	
Line Spacing	6, 4, 3 lines/inch, 1/48" proportional increments	
Paper Feed	Bidirectional, logic seeking	
Paper Feed Speed	4"/second	
Available Ribbons		Ribbon Life
	Single-strike black carbon film	60,000
	Multi-strike black carbon film	150,000
	Single-strike black correctable film	70,000
	Multi-strike black fabric	500,000
	Single-strike red film	2,000
	Correction tape	1,500

Interface	Standard RS-232C – Serial
Buffer Size	7K
Control Panel	Indicators: Select, Power, Alarm, Line, Pitch, and Copy (LEDs) Switches: Select, Line Feed, TOF, Line, Pitch, and Copy
Noise	Operating – Less than 65 dB
Temperature	50 to 105 F – 10 to 40 C (operating)
Humidity	20% to 80% non-condensing (operating) 5% to 90% non-condensing (storage)
Power	120 V, 60 Hz (Optional: 120 or 220 - 240 V, 50/60 Hz) 130 W Max.
Dimensions	21.18 (W) x 7.65 (H) x 15.15 (D) inches (538(W) x 194.5 (H) x 385 (D) mm)
Weight	33 lbs (15 kg)
Optional Features	Tractor feeder, Auto Cut Sheet Feeder, Single and Multi-strike ribbons, Interchangeable printwheels (Numerous languages and typestyles)

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We at MidWest Micro guarantee that we can save you up to 69% or more on your purchase of new fully warranteed equipment and supplies. And we will still give you friendly, courteous service. Call today and Save With Confidence!

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NEW! *Don't spend a fortune to own the world's most popular printer. . .*

LIST $349 **EPSON LX-86 $CALL$**

The new Epson Spectrum LX-80 is perfect for the vast majority of your personal and professional printing needs, such as reports, term papers, recipe files or mailing lists.

It's easy to set up and operate. And, with Epson's convenient SelecType feature, you can choose from a wide range of typestyles and graphics. With convenient Dual Mode operation, the LX-80 lets you zip through drafts at high speed, or produce finished copies with a high-quality, typewriter-style appearance. And it accepts a complete line of options for easy, future expansion

Because the LX-80 is made by Epson—the standard of the industry— it's compatible with virtually every computer system made. It inherits a reputation for dependability and durability that's unsurpassed by any other brand. And it offers a full one year warranty—the best in the business.

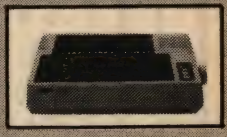
The new Spectrum LX-80 offers a combination of performance and value at a price that's second to none.

Epson continues to set the pace in computer printer performance with. . .

ALL NEW

UNBELIEVABLE SAVINGS

EPSON FX-85



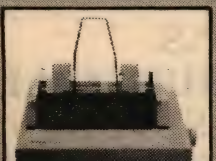
LIST $699

Quite simply the Epson FX-85 is the most intelligent way to print you can find. At a brisk 160 characters per second in draft mode and 32 characters per second typewriter style near letter quality mode, the FX-85 gives you professional versatility. A new 8K internal buffer stores up to 4 pages of data allowing you to print and use your computer at the same time.

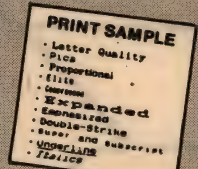
Plus, for an added measure of creativity, Epson's exclusive SelecType feature gives you finger tip selection of numerous popular typestyles at the touch of a few buttons. Its easy control panel selector means less time programming when changing typestyles. The FX-85 is equipped with both pin feed and friction feed and connects to your computer by simply plugging in a cable. And with Epson's full year warranty you can be sure you're getting the most in quality, dependability and performance.

Get a hard working business printer designed to give you a powerful advantage in meeting the hectic, high-pressure demands of today's business world. . . get the FX-85!

EX-800 & 1000



$Call and Save$



PRINT SAMPLE
- Letter Quality
- Pica
- Proportional
- Elite
- Compressed
- Expanded
- Emphasized
- Double-Strike
- Super and Subscript
- Underline
- Italics

Best Prices And Support On Epson Printers In USA!

- 24 Pin -
Letter Quality

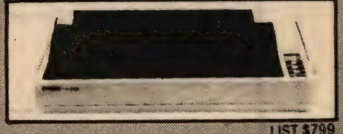
The EX-800 and EX-1000 is specially designed to handle corporate and small business printing needs easily and efficiently. They print at a speedy 300 cps in draft mode or switch to the near letter quality mode for that professional look. The new push-button SelecType II front control panel lets you choose from a combination of eight different typestyles. And there is even a user-installable color option kit that adds seven vibrant colors to your text and graphics.

The EX Series also provides a built-in push tractor feed that facilitates paper loading and allows short paper tear-off. And as with all Epson printers from MidWest Micro, you get a one year warranty. Whether you use a printer at home, small business, or the corporate environment, the EX Series makes an excellent choice for virtually any printing task.

The 136 column EX-1000 is ideal for spreadsheets and those large reports while the EX-800 can handle everything from correspondence to mailing labels. The EX Series sets the pace in the high speed printer market with uncompromised workmanship and reliability.

NEW **EPSON FX 286**

$Call & Save$



LIST $799

The new FX-286 Dot-Matrix Printer is ideal for use at home, in the office or multi-use corporate environment. You can turn out drafts at high speed, Near Letter Quality copies in seconds and graphics of superb resolution. Standard Tractor Feed and Friction Feed accommodate virtually any type of paper; single sheet or fanfold. For optimum versatility, SelecType gives you numerous typestyles at the touch of a button. The FX-286 uses the industry standard parallel interface and has a dip switch selectable "dual identity;" Epson standard code compatibility and IBM® printer emulation You even get build-in IBM graphics character sets for sharp resolution in graphs, charts and illustrations.

Optimum Versatility:
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CR-420I

JUST ~~$1095~~

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This stupendous brute of a printer will make short work of even your largest spreadsheets and reports. You will surprise yourself and amaze your friends and colleagues with this super printer performing in your office. Don't miss out on this one!

SPECIFICATIONS

Carriage Width 132 Columns (at 10 pitch)
Print Method: Impact dot matrix, bidirectional logic seeking in both text and graphics
Print Speed: 420 CPS/Draft. 104 CPS/Correspondence Quality. 2500 dots/sec – standard graphics. 1250 dots/sec – high-density graphics
Print Head: 8-pin, staggered arrangement
Character Sets: Standard 96 ASCII printing in 17 fonts
Line Spacing: n/180 (n=0-255)
Paper Feed: Pin feed (paper width adjustable) and built-in friction feed
Paper Width: 5" to 15" (pin feed). Up to 16" (feed)
Paper Path: Rear and bottom entry

CR 420I Ribbon Cartridges

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Get BIG SAVINGS on these Popular Options:

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PRINT SAMPLE
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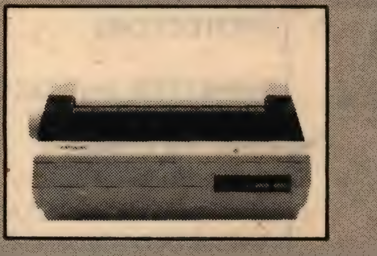
- 12 Pitch
- 10 Pitch
- Bold Printing
- Shadow Printing
- Underline
- Super and Subscript



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Capable of an array of printing tasks, the EPSON DX–10 Daisywheel Printer really comes on strong in word processing applications. It can turn out a typical business letter about three times faster than even the most nimble typist. The DX–10 is compatible with most home or office microcomputer systems on the market today, including the IBM PC and the Apple II. There is a wide variety of typestyles available using world famous Diablo interchangeable printwheels for true flexibility and total creativity. You can even get system expansion options such as a tractor feed for long printing jobs and a cut sheet feeder for aligning and inserting individual sheets of paper. And most importantly to back up EPSON'S commitment to excellence, a one year warranty comes with every DX–10 from MidWest Micro. For a dependable look you'll love on your correspondence, get the best you can buy with the EPSON DX–10 Daisywheel Printer.

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Monochrome Monitor
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Controller
Keyboard 5150
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Cable and Case
Assembled and Tested

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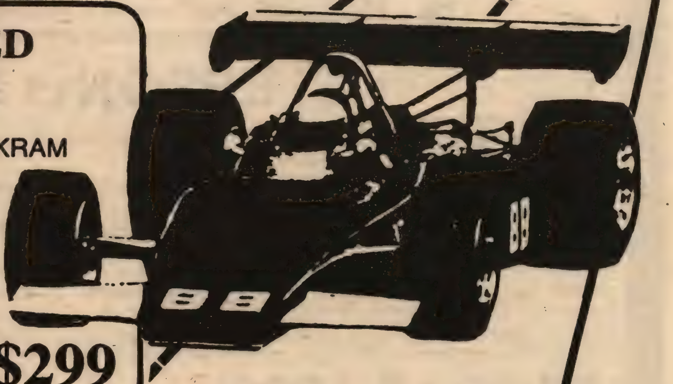

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TEAC 55 BV ½ height	$99

HARD DISK DRIVES

10 MB with controller and cable	$395
20 MB with controller and cable	$495
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IBM AT, System Board

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IBM PC/XT

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PC/XT CLONES Board

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MONITORS

MONITOR TTL Amber	$99
GOLD STAR COLOR RGB 13"	$299
MODEM 1200 BAUD Hayes Compatible	$145

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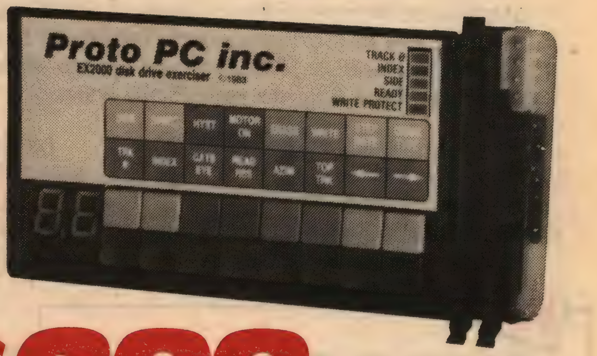

Options include cable sets and alignments disks for 3½", 5", or 8" drives, and the APL2 Adapter, allowing you to use one tool for all your drives. It's fast, easy to use, and backed by Proto's commitment to customer service. Available from stock, only $299. **Get all your floppies in shape, order an EX2000 today!**

$299

NOW WITH APPLE II CAPABILITY!

Now you can get the optional APL2 Adapter, for testing single and dual Apple II type drives. **$129**

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DEALER PRICE

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19" Color Monitor, 1024 x 768

Top of the line Mitsubishi 6922LP is ideal for demanding CAD/CAM/CAE applications. 19V" high-line monitor with in-line gun and analog input works with any high performance graphics board................ **$1979**

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This top-notch graphics board features 1024 x 1024 16 color resolution from a palette of 4096 colors. Compatible with Auto-CAD, Symgraph, P-CAD, and many others.
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- + 4 drive openings, instead of only 2
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- + Order from Proto, the tech support pros

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- + Ask about our full Mitsubishi line

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	DEALER
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ST4038 30MB AT System	$629
ST4051 40MB AT System	$745

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Buy your Fuji from Proto, an authorized Fuji distributor.

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	DEALER
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Floppy controller for 4-360K floppies, w/cable for 2	$ 35
Serial/parallel, w/optional 2nd serial. Great for XT.	$ 55

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These Samsung monochrome monitors are an outstanding value featuring excellent 720 x 350 resolution.

	DEALER
Samsung Amber	$95
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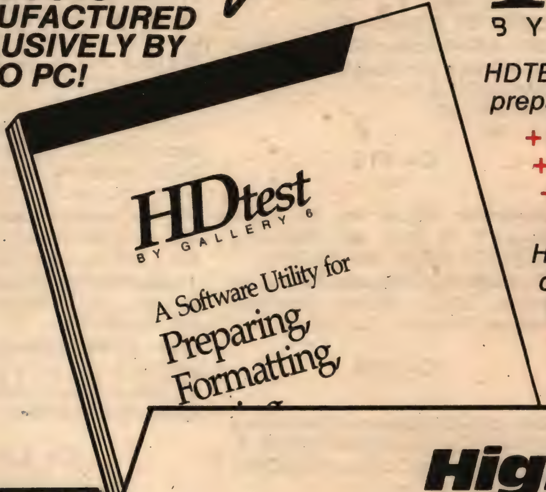

HDtest
BY GALLERY 6

New Version, More Features, Easier to Use

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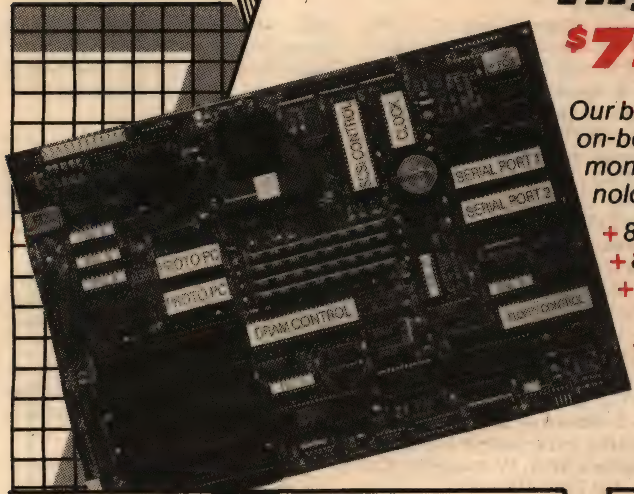
- *+ Load and save: drive and test parameters, bad track data*
- *+ Works with Auto-config*
- *+ Prints out test summaries*

$99

HDTEST will run on IBM PC, XT, AT, and true compatibles with a monochrome or color card under PCDOS versions 2.0, 2.10, or 3.10. Supported disk controllers include Western Digital, OMTI, Xebec, Data Technology (DTC), and Adaptec.

"HDTEST is an excellent diagnostic tool that should come in handy wherever hard disks are used." PC WEEK



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Our basic system includes the X16 motherboard with 1024K, case, power supply, keyboard, and many on-board functions including clock/calendar and floppy controller. Then add your choice of drives, monitors and cards to meet your needs. The fully XT compatible X16 motherboard combines technology, power and reliability for a top-performance computer. Place your order today!

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TEAC 55GF 1.2MEG half height	$115
Mitsubishi 360K half height	$ 88
Mitsubishi M2896 half height 8" .... exclusive	$385
Mitsubishi M2894 full height 8" ... exclusive	$439

Order your Proto PC floppy drive today!

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Users Groups

The User Groups Section is a regular feature of the *Computer Shopper*. This is where you can list your group's address at no charge. User Group listings are in state sequence followed by international groups. If you would like to have your group listed, follow the instructions listed below:

Submission Policy

All User Groups Section entries must be submitted in writing by the first Monday of every month. **Submissions received by the first Monday of December will appear in the February issue.** The listing will be good for three issues thereafter unless it cannot be verified.

FOG (P. O. Box 3474, Daly City, CA, 94015) is an international organization devoted to improved end user support, regardless of the equipment used. In order to provide **FOG** members with information regarding a local club, **FOG** maintains records on all know groups. Part of that data is now being used to produce the listings in this **User Groups Section**. Groups which are a part of the **FOG** network are so noted.

If a listing is found to be inaccurate or if an update report is not received from the non-FOG groups every three months, the listing will be deleted. Each group should appoint one officer who is responsible for promptly forwarding accurate information to:

Computer Shopper
The User Groups Section
P. O. Box F
Titusville, FL 32781

We are not responsible for errors published in these listings.

AK 907

FOG – 63–Generic Users Info & Devel Exchange (GUIDE), 1426 'H' Street, Anchorage, AK 99501. 907-338-1811

FOG – 89–Ketchican CP/M Users Group (KCPM), c/o Duane H. Fisher Jr., 1182 Black Bear Road, Ketchikan, AK 99901. 907-225-9249

FOG – 83–Baranof Users' Group (BUG), P. O. Box 1483, Sitka, AK 99835. 907-747-8615

FOG – 18–PENFOG (PENFOG), c/o Kenai Peninsula Community Coll, Box 848, Soldotna, AK 99669. 907-262-5801

AL 205

FOG – 49–First Alabama O U G (FAOUG), c/o Ed Burquez, 303 North Hwy 47, Columbiana, AL 35051. 205-669-5200

FOG –125–North Alabama Osborne Users Group (NAOUG), c/o John Heaman, 8705 Valley View Drive S.E., Huntsville, AL 35802. 205-881-0377

95-Huntsville AL Commodore Komp. Soc. (HACKS), P. O. Box 14356, Huntsville, AL 35815.

306-Greater Gulf Coast Computer Club (G2C3), c/o Spring Hill College, Mobile, AL 36608.

AR 501

307-Tri-State HUG (Tri-State HUG), c/o Gil Hoellerich, 2617 Country Way, Fayetteville, AR 72703. 501-521-4818

FOG – 23–AFOG (AFOG), c/o Data-Tronics Corp., Box 853, Fort Smith, AR 72902. 501-646-4617

308-Hot Springs Multi-Users Group, c/o Computerworks, P. O. Box 1193, Hot Springs, AR 71902.

309-Little Rock CP/M-MS/DOS Tech User G, c/o Elmer A. Wingfield, 26 Belmont Drive, Little Rock, AR 72204.

AZ 602

FOG –100–Tempe Osborne Group (TOG), 2537 North 65th Street, Scottsdale, AZ 85257. 602-994-0069

311-Arizona Commodore Users Group (ACUG), P. O. Box 27201, Tempe, AZ 85282. 602-839-4557

310-Gila Valley Apple Growers Assoc, P. O. Box 809, Thatcher, AZ 85552. 602-428-4073

CA 209

FOG – 35–Small Machine User's Group (SMUG), c/o Bill Houk, 6253 North Colonial, Fresno, CA 93704. 209-431-0480

312-Timex Z80 Users Group, c/o Ed Burton, 1611 Rose Avenue, Merced, CA 95340.

FOG – 66--South Valley FOG (SVFOG), c/o Olson Computer Services, 1502 North Lowery Street, Porterville, CA 93257. 209-781-4123

FOG – 11–Stockton Osborne Group (SOG), c/o Rod Payne, 4600 N. Pershing Avenue #C, Stockton, CA 95207-6789. 209-951-4701

FOG –139–Stockton Commodore 64 Users Group, c/o Yita McCann, 2929 Calariva Drive, Stockton, CA 95204. 209-948-5890

CA 213

437-Greater South Bay PC Users Group, P. O. Box 1937, Redondo Beach, CA 90278. 213-398-8153

164-South Bay Computer Education Group, 23121 South Western Avenue, Torrance, CA 90501.

CA 408

FOG –116–CP/M Users of Santa Cruz (CP/MUSC), c/o John Campbell, P. O. Box 628, Ben Lomond, CA 95005. 408-476-0504

314-Gavilan Users Group, c/o R. W. Brown, 780 Manx Avenue, Campbell, CA 95008. 408-379-2774

315-Byte Bandits of America, c/o R. W. Brown, 780 Manx Avenue, Campbell, CA 95008. 408-379-2774

313-Groups Using Timex Sinclair of S V (GUTS/SV), c/o Bill Miller, 6675 Clifford Drive, Cupertino, CA 95014-4530. 408-253-3175

439-Silicon Valley Computer Society (SVCS), 2464 El Camino Real Suite #190, Santa Clara, CA 95051. 408-286-2969

FOG – 1–First FOG of Silicon Valley (1st FOG SV), c/o Glen W. Stinnett, 21240 Canyon View Drive, Saratoga, CA 95070. 408-371-8699

FOG – 5–Monterey Bay Area O U G (MBAOUG), c/o Freedom Fastprint, 178 Barbara Way, Watsonville, CA 95076. 408-728-1416

CA 415

443-Coleco Adam Users' Group (CAUG), c/o Robert F. Baker, 2007 Lincoln Ave Apt C, Alameda, CA 94501.

316-TRS Nybblers, c/o Dr.M. Edwards, Chabot College, 25555 Hesperian Blvd, Hayward, CA 94545. 415-846-3575

321-San Francisco TI 99ers, c/o Gary L. Anderson, 24816 Mango Street, Hayward, CA 94545.

FOG – 68–San Mateo Osborne Group (SMOG3), c/o Philip A. Moore, 1331 Crane Street, Menlo Park, CA 94025. 415-325-2442

317-Small Computer Users of Marin, c/o Computer Systems of Marin, 301 Poplar Street, Mill Valley, CA 94941. 415-388-4805

444-Apple III Users of No. Calif, 220 Redwood Hwy #184, Mill Valley, CA 94901. 415-383-0203

FOG – 31–Marin Osborne Group (MOG), P. O. Box 1726, Novato, CA 94948. 415-897-0629

FOG – 3–East Bay FOG (EBFOG), c/o Patricia Watters, 5497 Taft Avenue, Oakland, CA 94618. 415-272-9099

320-Radio Shack Model 100, 102, 200 UG, c/o Richard Hanson, P. O. Box 23438, Pleasant Hill, CA 94523.

318-San Mateo TRS-80 Users Group, 2691 Cottonwood Drive, San Bruno, CA 94066. 415-873-5107

319-First Amiga Users Group (1st AUG), 543 Old Country Road, San Carlos, CA 94070. 415-595-5452

FOG – 2–San Francisco Computer Society (SFCS), c/o Ralph Gallagher, 2408 California Street, San Francisco, CA 94115. 415-929-0252

158-San Leandro Apple Eaters Users Grp, c/o Bob Shayler, 2200 Bancroft Ave., San Leandro, CA 94577.

79-Stanford Palo Alto User Group, P. O. Box 3738, Stanford, CA 94305. 415-493-0979

FOG – 60–Mt. Diablo Osborne Group (MTDOG), c/o Larry's Booknook, 730 - A Bancroft Road, Walnut Creek, CA 94598. 415-933-2665

CA 619

FOG –114–High Desert Osborne Group (HOG), c/o Daniel H. McClure, 74860 Base Line Street, Twentynine Palms, CA 92277-3812. 619-367-2440

CA 707

FOG – 29–Humboldt Osborne Group (HOG), c/o R C Electronics, P. O. Box 2751, McKinleyville, CA 95521. 707-445-2074

FOG – 56–North Bay FOG (NBFOG), c/o Valley Oak Apts, 2600 North Coast Street, Santa Rosa, CA 95401. 707-546-0145

FOG – 6–Microcomputer U G of Solano & Yolo (MUGSY), c/o Ron Forsythe, 450 Russell Street, Vallejo, CA 94591. 707-557-5162

CA 714

FOG –113–North Orange County C C Osborne SIG (NOCOSIG), c/o Scott Cosel, 1675 Comstock Avenue, Los Angeles, CA 90024-5320. 714-952-5627

CA 805

323-San Fernando Valley 99ers, P. O. Box 1844, Canyon Country, CA 91351. 805-255-7583

FOG – 47–Central Coast Osborne Group (CCOG), c/o Melvin Johnson, 1836 10th Street, Los Osos, CA 93402. 805-528-2382

322-Hi Desert Apple Computer Club, c/o Kevin Taunton, 5221 West Avenue L-12, Quartz Hills, CA 93536.

FOG – 69–Osborne Santa Barbara Users Group (OSBUG), c/o Santa Barbara Co Audit Fiscal, 205 Vernal, Santa Barbara, CA 93105. 805-687-8541

FOG – 42–Santa Maria Osborne Group (SMOG), c/o Burt L. Fielding, 325 Poppinga Way, Santa Maria, CA 93455. 805-937-1128

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390-QB-99'ers User Group, c/o Frank Cotty, Queensborough Community College, Bayside, NY 11364.

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391-Suffolk Apple Computer Club, P. O. Box 349, Smithtown, NY 11787. 516-360-0797

NY 518

392-Tri City Commodore User's Group (TCCUG), P. O. Box 12742, Albany, NY 12212-2742. 518-456-5721

NY 607

217-Sinclair Computer Users Society (SINCUS), c/o Paul Hill, 1229 Rhodes Road, Johnson City, NY 13790.

393-Leatherstocking Commodore User's Cl, P. O. Box 1284, Oneonta, NY 13820.

219-TWIN Tiers Users Group, c/o Rose J. Sass, Rock Stream, NY 14878.

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FOG -129–NIAgara FRontier Osborne Group, c/o Robert W. Spencer, 238 Sterling Avenue, Buffalo, NY 14216. 716-838-6893

394-Buffalos Adam Enterprise, 162 Kennedy Road, Buffalo, NY 14227.

395-Atari Computer Owners of Rochester (ACORN), P. O.Box 855, Fairport, NY 14450. 716-334-5820

FOG -132–First Rochester Osborne Group (FROG), c/o James T. McCollum, Attorney, 321 Executive Office Bldg, Rochester, NY 14614. 716-232-7272

NY 718

396-Brooklyn Commodore Users Group, c/o Malcolm Jay Gottesman, 1735 East 13 St Apt 7N, Brooklyn, NY 11229.

397-Sheepshead Bay Computer Group, 2546 East 24th Street, Brooklyn, NY 11235.

NY 914

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398-Central Westchester 99'ers, 1261 Williams Drive, Shrub Oak, NY 10588.

OH 216

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400-Cleveland Sinclair Users Group, c/o Thomas Simon, 615 School Avenue, Cuyahoga Falls, OH 44221.

290-The Northcoast 99ers, P.O. Box 23283, Euclid, OH 44123-0283. 216-357-7274

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226-Cincinnati's Tandy Users Group (CINTUG), P.O. Box 399145, Cincinnati, OH 45239. 513-525-0723

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OK 405

FOG - 67–OKlahoma CP/M Users' Group (OKCPM), c/o William S. Cooter, 1809 Vanessa Drive, Norman, OK 73071. 405-360-2141

233-Tinker Atari Computer Enthusiasts (TACE), P.O. Box 19456, Oklahoma City, OK 73144. 405-387-5649

OK 918

FOG - 51–Osborne Users of Tulsa (OUT), c/o James R. Roop, 1632 S. Denver, Tulsa, OK 74119-4233. 918-587-3918

232-Green Country Computer Association, P.O. Box 497, Tulsa, OK 74101. 918-245-6217

441-Tulsa Computer Society, P. O. Box 3211, Tulsa, OK 74101.

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OR 503

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PA 215

FOG -121–Philadelphia Region O Group (PhROG), P. O. Box 1144, Paoli, PA 19301. 215-648-5862

404-Philadelphia Heath Users' Group, P. O. Box 18148, Philadelphia, PA 19116-0148.

PA 412

FOG - 50–Three Rivers Osborne Group (TROG, PA), P. O. Box 23152, 4th Ave. Station, Pittsburgh, PA 15222. 412-661-2446

PA 717

406-Southcentral PA Atari Comp Enthusia (SPACE), P. O. Box 11446, Harrisburg, PA 17108-1446. 717-657-3335

407-Central PA TI-99/4A Users Group, P. O. Box 14126, Harrisburg, PA 17104-0126. 717-657-4992

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240-Nittany Users of Texas Instruments (NUTI), 625 Wiltshire Drive, State College, PA 16803. 814-238-0396

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408-Spartanburg Commodore Users Group (SPARCUG), P. O. Box 319, Spartanburg, SC 29322.

TN 615

409-Par I PC User Support Group, P. O. Box 681, Knoxville, TN 37901.

FOG -119–Nashville CP/M Users Group (NCP/MUG), P. O. Box 24606, Nashville, TN 37202-4606. 615-361-4210

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411-Commodore Assoc of the Mid South, c/o Steven C Peyrot, 3318 Keystone Avenue, Memphis, TN 38128. 901-357-8576

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250-Dallas TI Home Computer Group, P. O. Box 29863, Dallas, TX 75061. 214-579-7822

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TX 806

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123-Tarrant County Osborne Group (TCOG), c/o Marc McCauley, 3910 El Campo, Fort Worth, TX 76107. 817-332-7027

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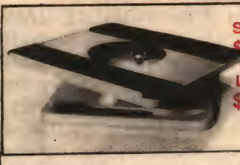

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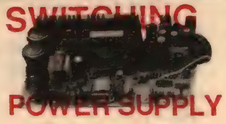

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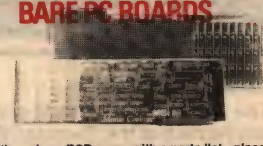

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- 8087 MATH PROCESSOR. OPTIONAL
- 8 IBM COMPATIBLE EXPANSION SLOTS
- 4 DMA AND TIMER CHANNELS

WE'VE GOT THE NEW QUMETRACK 142 DRIVES

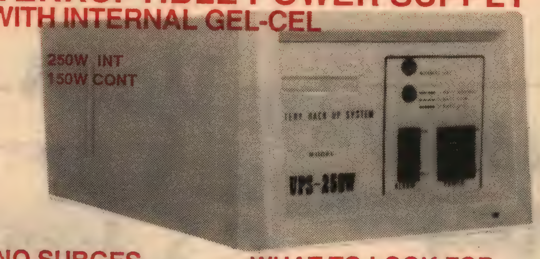
$79.95

FCC OK

- Double Sided Double Densitv
- ½ Height ● 48 TPI
- New Quiet Operation
- IBM Compatible
- New Front Panel Design

REAL IBM DRIVES

UPS-250W
UNINTERRUPTIBLE POWER SUPPLY
WITH INTERNAL GEL-CEL



What is the most annoying thing you can have happen while you are using your XT, MAC or other computer?? You guessed it, a power failure or sharp line transient that causes total loss ofcurrent work-file data in RAM, and that can also cause hard drive head crash, ruining the data or even ruining the drive. A UPS is the answer to this problem. The letters stand for Uninterruptible Power Supply, and refer to a power supply with a built in Battery that constantly monitors the AC line and when it sees a drop in the 120 volt line it starts to run the computer from the battery, synthesizing the 120V 60 cycle sine wave and running your whole system for you. This allows you to quickly back-up your files, and shut down your system in the proper sequence. You can even keep going as if nothing had happened and as long as the line power came back within a reasonable time you would not have any loss at all of operating time or data.

NO SURGES
NO BROWN OUT
CUTS OUT LINE NOISE

$289.95

WHAT TO LOOK FOR

1. High efficiency	85%
2. Sinewave(avoid modified square wave)	Sinewave
3. Internal no-spill battery	Yes
4. External battery terminals	Yes
5. Audible power loss warning	Yes
6. Fast transfer time, under 5 Ms	Yes
7. Multiple output sockets	2
8. % of line transients filtered	100%

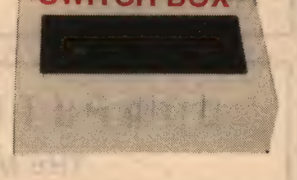
PORTABLE 120V SOURCE FOR CAR/BOAT USE

Just run from the 12VDC vehicle plug and you can have 150 Watts of 110V AC for running any item(250W intermittent)

WE HAVE A GREAT DEAL FOR HOBBY GROUPS BUY 10 AND GET ONE FREE, YES FREE, NO $$.

Yes an automatic discount for anyone who wants to buy in small volumes. Wholesale discounts can be arranged, please call with your needs.

SWITCH BOX



These switch boxes are high quality, with fully switched wiring, not the cheap type that only switches the enable line. They come in both serial and parallel styles with a fan out of 2 or 4. The push button selector allows for easy one hand use.

SER/2 $39.95 PAR/2 $39.95
SER/4 $44.95 PAR/4 $44.95

CABLES CABLES

8 FEET,10 FEET, 20 FEET

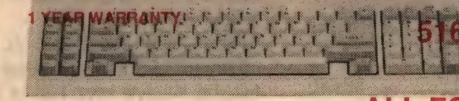
PARALLEL Std IBM printer cable, 25-36 pin, double shielded8'..$8.95,10'..$9.95

SERIAL, Std IBM serialcable, 25-25 pin double shielded8'....$8.95, 10'....$9.95

EXTENDER, 36 pin male to female Centrnics for fan out boxes or extensions etc. 8'....$10.95, 10'....$12.95, 20'....$19.95

IBM COMPATIBLE KEYBOARD

1 YEAR WARRANTY!



ALL FCC OK

The keyboard is one of the two parts of any system that are full of moving parts, and are heir to mechanical failure. So you should take care before you pay your $$$ for what may be a piece of junk. What does it matter if you save $10.00 and get 1000 hours of aggravation over the next few months(if it works that long) with rubbery switches, funny clicking noises, painted plastic that rubs off, and so on. Here at Parts Galore we buy with care, so that we do not sell any junk, because we do give a warranty, and we have been in the mail order business for 7 years. Can all the newcomers in mail order say that?? Can you trust them??

5150 The Std XT type, with large Return key, all features built in micro....................$54.95

5160 The Std AT/XT autoswitch type, with LED status panel, and large return key,all features and built in micro....................$64.95

5151 The enhanced XT type number and cursor pad, large return key, all features and has built in micro..........$74.95.

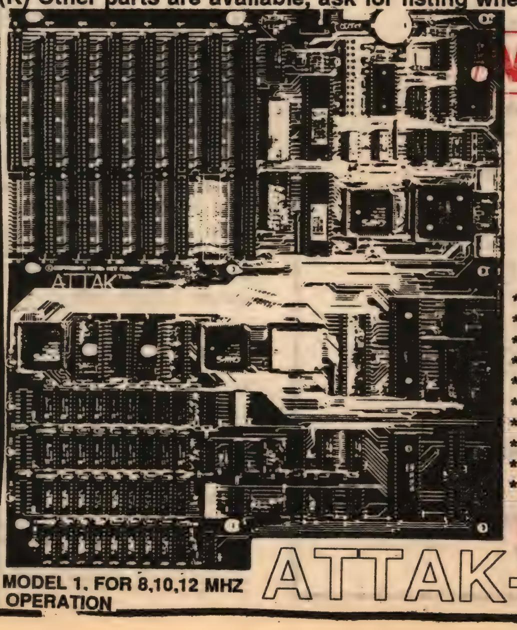
5161 The enhanced AT/XT type, with numeric and cursor pads, LED status panel, autoswitch, large return key, all features, and built in micro..........$88.95..

ATTAK-286

At last the ATTAK-286 board is in stock!, It was worth the wait as it is a very good board using the LSI chip set from CHIPS TECHNOLOGY that you have read about. The board is the same size as the real AT and has 4 layers for noise free operation. It has all the features of the AT, and some more of it's own, like 1MB on board,8,10,12 Mhz operation, PHOENIX BIOS, and it runs like a deer.
We got our pictures too late to make this press run of the SHOPPER but if you call up we can send you a set of descriptive literature that will tell more than we could put in this ad.
We are offering the board in several formats to suit almost all buyers. All boards have been pretested for shorts and opens on a bed of nails.

(A) Fully wired and tested,zero RAM, with all IC's, ...$495.00
(B) Socketed board, pretested, but no IC's at all,.. .$199.00
(C) Bare pretested PCB with parts list.............................$99.00
(D) Detailed technical manual with full C & T data and full schematics, with users hints...............$29.95
(E) PHOENIX BIOS, for B,C above only, very fast $59.95
(F) Keyboard BIOS, in EPROM/CPU chip.......................$29.95
(G) Power supply, 200 Watt, FCC/UL OK.......................$129.95
(H) HINGED TOP AT CASE, Easy access $129.95
(I) AT Keyboard, see AT/XT keyboards
(J) CHIPS & TECH 5 Chip set...$99.00
(K) Other parts are available, ask for listing when you order.

NEW!



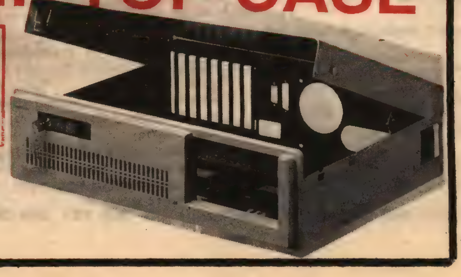
MODEL 1. FOR 8,10,12 MHZ OPERATION

- * 8 INTERFACE CONNECTORS
- * RUNS ALL BIOS ROMS
- * 1 MEGABYTE ON BOARD
- * STANDARD KEYBOARD I/F
- * CMOS CLOCK CALENDAR
- * 80287 MAT CHIP OPTIONAL
- * RUNS 8,10,12 MHZ
- * ON BOARD BATTERY
- * STD AT BOARD SIZE
- * AT PERIPHERAL CIRCUITS

Board Size: Standard IBM-AT*
Dimensions: 12 inch × 13.8 inch with 6 mounting holes to fit all AT compatible cases.

CHIPS & TECHNOLOGY
ATTAK-286 CHIP SET

AT FLIP TOP CASE



Coming Events

If you know of or have a trade show, swap meet or club meeting connected with the computer field, we'll run an announcement in the COMING EVENTS section FREE of charge.

DECEMBER

December 3-5, 1986
The second annual INTERFACE in JAPAN Conference and Exposition will be held at the World Import Mart and Sunshine City Prince Hotel in Tokyo, Japan. Leading Asian companies are expected to display and demonstrate computer systems. This show will also feature a conference of more than 25 sessions led by international experts, on a variety of technical and management-oriented subjects related to data communications and office systems integration.

For additional information contact The Interface Group, Inc., 300 First Avenue, Needham, MA 02194; (617) 449-6600.

December 6, 1986
The second annual RENO COMPUTER FAIRE is scheduled for December 6th. It will be housed in 7,000 square feet of space and have local and national major vendors in attendance.

For additional information contact Mike Katz at (702) 852-BYTE.

December 6, 1986
The BAY AREA COMPUTER SWAP will be held at the Cow Palace, San Francisco, California. Ths is a one-day personal computer swap meet where thousands of new and used products will be available for immediate purchase by show attendees.

Retailers, manufacturers, distributors and individuals will offer outstanding savings on a wide variety of hardware and software products for business, education, entertainment, hobby and home use. Accessories, supplies, peripherals and complete personal computer systems representing hundreds of brand names will be available to shoppers and discount prices.

For additional information contact MICROSHOWS 1209 Donnelly Avenue, Suite 203, Burlingame, CA 94010; (415) 340-9113.

December 7, 1986
The 5th South Jersey Micro Show will be held at the Aspen Manor/Hotel on Route 46 in Parsippany, NJ, near Interstates 80, 280 and 287. Over 400 vendors will sell and display personal computer products of all kinds. Show hours are 9 AM to 4 PM. For additional information call 800-631-0062 or in New Jersey call 201-297-2526. Sponsor of the show is Ken Gordon Productions.

December 7, 1986
The MICRO COMPUTER FAIR will be held at the Oak Brook Hyatt, 1909 Spring Road, Oak Lawn, Illinois. Personal, business, hobby, hardware, software, supplies, accessories. Admission $3 per person. For additional information contact Tom Zarecki (312) 839-2611.

December 11-13, 1986
The second annual INTERFACE in Japan Conference and Exposition will be held at the Harumi Exhibition Center and Keio Plaza Hotel in Tokyo. More than 150 companies are expected to display and demonstrate computer systems and communications services for large-scale corporate, government and institutional systems users in Japan, Korea, Taiwan (R.O.C.), Singapore, Hong Kong, and the People's Republic of China. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

December 14, 1986
The 120th Boston Area Micro Show will be held at the Sheraton Exhibit Center, I-495 and Route 111, in Boxboro, Mass. (New location - other shows held in Woburn, Mass.) Over 200 vendors will and display personal computer products of all kinds. Show hours are 10 AM to 4 PM. For additional information call 800-631-0062 or in New Jersey call 201-297-2526. Sponsor of the show is Ken Gordon Productions.

December 28, 1986
The ROCKLAND COUNTY COMPUTER FAIR returns to the Holiday Inn, Suffern, New York, located at exit 14B of the N.Y. Thurway. The hotel is just 30 minutes from NYC and is 5 miles from the intersection of the Garden State Parkway with the Thruway. Open to the public from 10am to 4pm.
For additional information call (201) 533-1991.

JANUARY 1987

January 23-24, 1987
The second annual USER GROUP AND COMPUTER SHOW will be held at the West Manchester Mall, 1800 Loucks Road, York, PA 17404. Area user groups and local computer vendors will be present to help the computer user and hobbyist. Advance registration required by user groups and vendors. Free admission to the public.

For additional information contact Ms. Barbara Sipling, Marketing Director, (717) 764-5941.

FEBRUARY 1987

February 1, 1987
The COMPUTER/CAMERA/VIDEO SWAP MEET will be held at the Century Center, downtown South Bend, Indiana from 10am-4pm; exhibitor set-up 8am.

For additional information contact Roger L. Smith, P.O. Box 6486, South Bend, IN 46544; (219) 259-2968 before 9:30pm EST.

February 7-8, 1987
The 27th TROPICAL HAMBOREE sponsored by Dade Radio Club will be held at the Dade County Youth Fairgrounds at Tamiami Park. This well established event will have two full days of activities including 200 commercial exhibit booths, 1,000 tables of pre-owned equipment, and numerous technical presentations on subjects such as packet radio and satellite communications, plus valuable awards. Hours are 9:00am to 5:00pm Saturday and 9:00am to 4:00pm sunday.

For additional information contact Evelyn Gauzens, 2780 N.W. 3 Street, Miami, FL 33125; (305) 642-4139.

APRIL 1987

April 6-7, 1987
The PUBLISHERS WORKSHOP will be held at the Hyatt Regency Hotel in Fort Worth, Texas. The sponsor of this workshop is Tandy Corporation/Radio Shack Education Division. For additional information contact Tandy Corp., 1700 One Tandy Center, Fort Worth, TX 76102; (817) 390-3487.

April 7-9, 1987
FOURTH ANNUAL INTERNATIONAL CONFERENCE ON TECHNOLOGY AND EDUCATION: "A WORLD REVIEW" will be held at the Hyatt Regency Hotel in Fort Worth, Texas. The sponsors of this conference will be Tandy Corporation/Radio Shack Education Division, The University of Texas Department of Continuing Education, The University of Tennessee, The University of Edinburg (Scotland) School of Artificial Intelligence. For additional information contact Tandy Corp., 1700 One Tandy Center, Fort Worth, TX 76102; (817) 390-3487.

MAY 1987

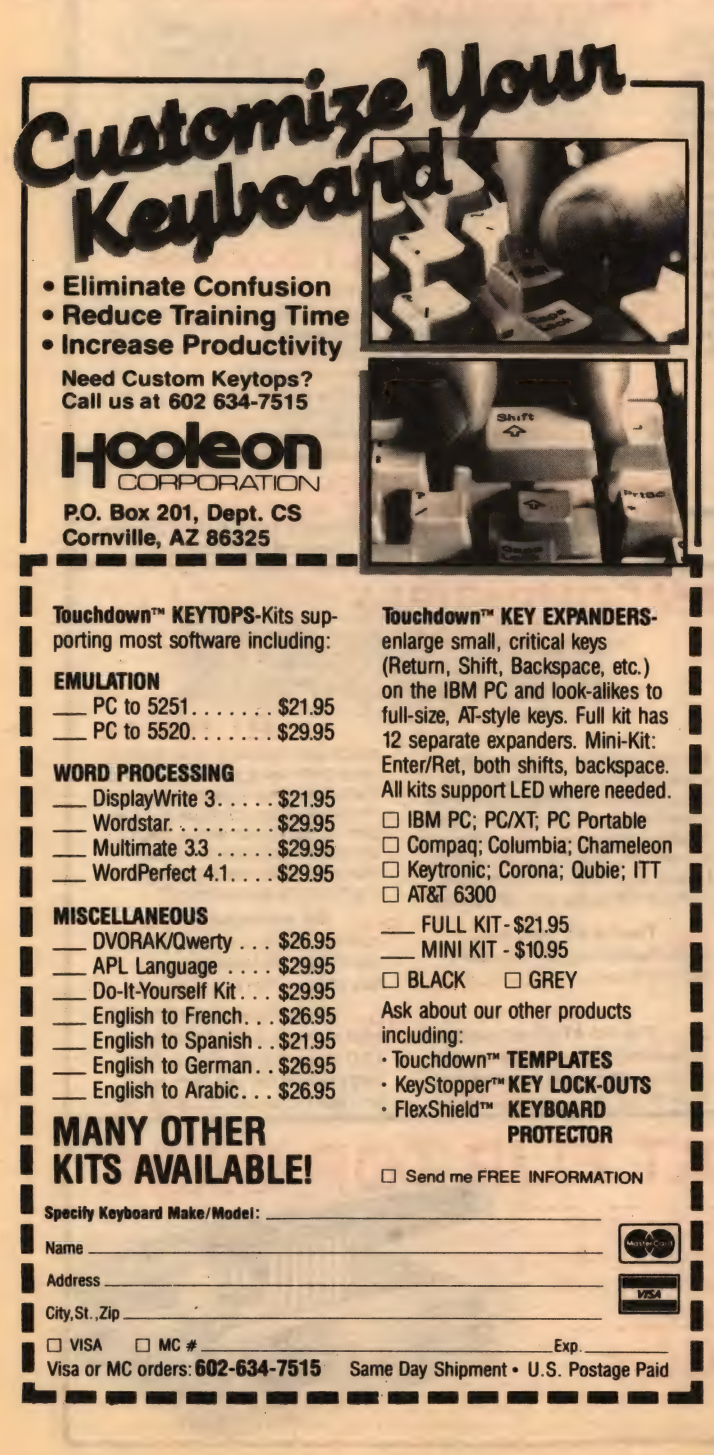
May 3, 1987
The COMPUTER/CAMERA/VIDEO SWAP MEET will be held at the Century Center, downtown South Bend, Indiana from 10am-4pm; exhibitor set-up 8am.

For additional information contact Roger L. Smith, P.O. Box 6486, South Bend, IN 46544; (219) 259-2968 before 9:30pm EST.

SEPTEMBER 1987

September 13, 1987
The COMPUTER/CAMERA/VIDEO SWAP MEET will be held at the Century Center, downtown South Bend, Indiana from 10am-4pm; exhibitor set-up 8am.

For additional information contact Roger L. Smith, P.O. Box 6486, South Bend, IN 46544; (219) 259-2968 before 9:30pm EST.



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Admission: $3.50
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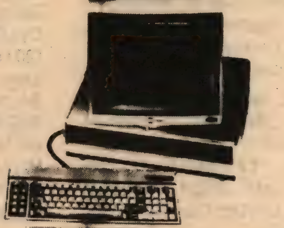

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Bulletin Board

The Bulletin Board is a regular feature of the *Computer Shopper*. This is where you can list your public access community bulletin board or Remote System at no charge. All listings are in area code sequence. If you would like to have your Remote System listed, follow the instructions listed below:

Submission Policy

All Bulletin Board entries must be submitted in writing by the first Monday of every month. **Submissions received by the first Monday of December will appear in the February issue.** The listing will be good for three issues thereafter unless it cannot be verified.

PRACSA (Public Remote Access Computer Standards Association, (415)948-2513) and **FOG** (P. O. Box 3474, Daly City, CA, 94015) are organizations devoted to the enhancement of the computer experience. Therefore members of these two organization are now assisting in the maintenance and verification of entries in **The Bulletin Board**.

A large percentage of the listings received have been voice numbers not associated with Remote Systems. This is an inconvenience for owners of the phone numbers which must be eliminated.

FOG and **PRACSA** members will attempt to verify each listing at least once every three months. If a listing is found to be inaccurate, it will immediately be deleted from the listing. If an update report is not received every three months, the listing will also be deleted. All SysOps are responsible for promptly forwarding accurate information to:

Computer Shopper
The Bulletin Board
P. O. Box F
Titusville, FL 32781

We are not responsible for errors published in these listings.

(201)239-1346, **MicroSellar BBS** -- Verona, NJ. 1200/2400 baud, online ?? hrs. SysOp: Mark Raff. Does not support 300 baud.

(201)261-1977, **Heath-17** -- Fair Lawn, NJ. 300 baud, online ?? hrs. SysOp: David J. Fischer. Online games with contests and prizes.

(201)265-2481, **Dial-Your-Match -399** -- Fairlawn, NJ. unknown baud, online ?? hrs. SysOp: Unknown.

(201)290-1349, **Omegammon DBBS** -- Matawan, NJ. 3/12/24 baud, online 24 hrs. SysOp: John Ross. IBM and Compatibles.

(201)297-7399, **Pan World Internat.** -- North Brunswick, NJ. 300/1200 baud, online 24 hrs. SysOp: Alex Fongbin. IBM-PC, Apple, Mac, Commodore, CP/M.

(201)352-6118, **MIDI Apple Users Group** -- Elizabeth, NJ. unknown baud, online 7pm-7am,24hrSS. SysOp: Maria Rios. Apple.

(201)370-8021, **The Syndicate** -- Larelwood, NJ. 300/1200 baud, online 24 hrs. SysOp: W Miller.

(201)376-6581, **Sigma BBS** -- Millburn, NJ. 300 baud, online 24 hrs. SysOp: Unknown. Apple][c.

(201)379-1459, **Skull Island BBS** -- Millburn, NJ. 300 baud, online 24 hrs. SysOp: John Patuto. Atari.

(201)381-4107, **Tele-Master:Speed-Line** -- ????, NJ. 300/1200 baud, online 24 hrs. SysOp: Gary Spiewak. Ring Back (Let ring once, and then call back).

(201)467-2739, **FOG -41** -- Elizabeth, NJ. 300/1200 baud, online 24 hrs. SysOp: George' Porcella. Jersey Osborne Group (FOG AMO #138) member supported system. **PRACSA member**

(201)494-3558, **Transmission Relay Stn** -- Edison, NJ. 300/1200 baud, online 24 hrs. SysOp: David Risack.

(201)494-3649, **Micro-Fone (MFTBBS)** -- Metuchen, NJ. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(201)494-8666, **Brainy Boro BBS (BBBS)** -- Metuchen, NJ. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(201)558-1552, **Dial-Your-Match -299** -- Elizabeth, NJ. unknown baud, online ?? hrs. SysOp: Unknown.

(201)625-0235, **Dial-Your-Match -374** -- Rockaway, NJ. unknown baud, online ?? hrs. SysOp: Unknown.

(201)654-1680, **Attic-Static** -- Westfield, NJ. 300 baud, online 24 hrs. SysOp: Unknown.

(201)659-7325, **Village Xchange** -- Jersey City, NJ. unknown baud, online ?? hrs. SysOp: Henry Linsangan.

(201)689-0492, Xanth ST BBS -- Washington, NJ. 3/12/24 baud, online 24 hrs. SysOp: Unknown. Atari 520ST.

(201)743-4850, **Flash-Talk** -- Bloomfield, NJ. 300 baud, online 24 hrs. SysOp: Unknown.

(201)793-0996, **Atlantist Atari ST BBS** -- Normandy Beach, NJ. unknown baud, online ?? hrs. SysOp: Karl Mohel.

(201)848-8217, **FOG -49** -- Wycoff, NJ. 3/12/24 baud, online 24 hrs. SysOp: Peter Zuroff. **PRACSA member**

(201)852-7335, **Intelenet EMS** -- Hackettstown, NJ. 300/1200 baud, online 24 hrs. SysOp: Mark S. Bond. Apple users forum featuring return receipt mail.

(201)853-3187, **Swingles** -- Greenwood Lake, NJ. 3/12/24 baud, online 24 hrs. SysOp: Unknown.

(201)861-7680, **InterCHAT** -- North Bergen, NJ. 300 baud, online 24 hrs. SysOp: Unknown.

(201)886-8041, **ACGNJ BBS2** -- Cliffside Park, NJ. 3/12/24 baud, online 24 hrs. SysOp: Stephen M. Leon. SIG/M, PC/Blue, Amiga, C128.

(201)891-0276, **Devil's Tower BBS** -- Wyckoff, NJ. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari 800XL.

(201)920-2353, **Caddy Shack** -- Bricktown, NJ. 300/1200 baud, online 24 hrs. SysOp: Rich Lowenburg. AE simulator, Atari, IBM, health info, games, cash casino.

(201)928-9488, **Coco Creations BBS** -- Jackson, NJ. 300/1200 baud, online 24 hrs. SysOp: Howard Wolk.

(201)944-0167, **Electronic Exchange** -- Fort Lee, NJ. 300/1200 baud, online 24 hrs. SysOp: Bob Bennett.

(201)944-4058, **The Attic BBS** -- Fort Lee, NJ. 300/1200 baud, online 24 hrs. SysOp: Peter Bennett.

(201)962-4956, **Skylands BBS** -- Ringwood, NJ. unknown baud, online ?? hrs. SysOp: Ed Narwid.

(201)972-8731, **Beyond Reality** -- Morganville, NJ. 300 baud, online 24 hrs. SysOp: Unknown.

(202)544-4751, **Dial-Your-Match -306** -- Washington, DC. unknown baud, online ?? hrs. SysOp: Unknown.

(202)575-3351, **Dial-Your-Match -244** -- Washington, DC. unknown baud, online ?? hrs. SysOp: Unknown.

(203)366-1234, **Dave's Color FIDO** -- Bridgeport, CT. 300/1200 baud, online 24 hrs. SysOp: David Beaudoin.

(203)629-1695, **Dial-Your-Match -343** -- Greenwich, CT. unknown baud, online ?? hrs. SysOp: Unknown.

(203)637-1378, **Andromeda BBS** -- Riverside, CT. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(203)698-0588, **The Ark** -- Old Greenwich, CT. 3/12/24 baud, online 24 hrs. SysOp: Jim Bolster.

(203)822-8176, **Cards & Comic Collecto** -- Bactic, CT. 300 baud, online 24 hrs. SysOp: Bruce Bouley. News, conventions, stores, etc. for the collector.

(203)848-7942, **Oakdale CP/M PBBS** -- Oakdale, CT. 3/12/24 baud, online 24 hrs. SysOp: Lester Osborne.

(203)871-1092, **Flagship BBS** -- Rockville, CT. 300/1200 baud, online 24 hrs. SysOp: Unknown. Online application, all computers.

(204)253-1342, **Pokey's Place** -- Winnipeg, Manitoba. 300/1200 baud, online 24 hrs. SysOp: Unknown. Apple][e.

(204)687-8665, **Data & Security System** -- Flin Flon, Manitoba. 300/1200 baud, online 24 hrs. SysOp: Nick Berzenji.

(204)783-9441, **Fido-in-Snow** -- Winnipeg, Manitoba. 300/1200 baud, online 24 hrs. SysOp: Unknown. IBM.

(204)832-4593, **Muddy Water Osborne Gp** -- Winnipeg, Manitoba. unknown baud, online 24 hrs. SysOp: Terry Smythe. Serious CP/M.

(204)956-0136, **Dial-Your-Match -187** -- Winnepeg, Manitoba. unknown baud, online ?? hrs. SysOp: Unknown.

(205)265-5096, **Bear's Licorice Disk** -- Montgomery, AL. 3/12/24 baud, online ?? hrs. SysOp: David M. Hicks.

(205)343-1933, **Forum 80** -- Mobile, AL. unknown baud, online ?? hrs. SysOp: Unknown.

(205)626-7447, **Pep's Data Service** -- Mobile, AL. unknown baud, online ?? hrs. SysOp: Unknown.

(205)774-8464, **Trans World Atari BBS** -- Ozark, AL. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(205)826-6053, **The Apple Group** -- Auburn, AL. unknown baud, online ?? hrs. SysOp: Unknown.

(205)866-7895, Byte Junction -- Citronelle, AL. 300/1200 baud, online 24 hrs. SysOp: Joe Chancery. Atari ST.

(205)969-2416, **The Alley Music RBBS** -- Birmingham, AL. 300/1200 baud, online 24 hrs. SysOp: John Sudderth.

(206)244-0359, **Fido in Broken Window** -- Seattle, WA. 300/1200 baud, online 24 hrs. SysOp: Robert Phiel. Supplies and supports all systems.

(206)347-0243, **Public Domain Silo** -- Everett, WA. 300/1200 baud, online 24 hrs. SysOp: M Marean. C-128 & Amiga.

(206)457-3248, **Dial-Your-Match -336** -- Port Angeles, WA. unknown baud, online ?? hrs. SysOp: Unknown.

(206)747-1944, **Bellevue Crossroads PC** -- Bellevue, WA. unknown baud, online ?? hrs. SysOp: Rich Green. IBM & PC-Board.

(206)823-5679, **Dial-Your-Match -220** -- Kirkland, WA. unknown baud, online ?? hrs. SysOp: Unknown.

(206)839-3415, **Dial-Your-Match -47** -- Redondo, WA. unknown baud, online ?? hrs. SysOp: Unknown.

(206)964-3618, **Micro Advertising Inc** -- Dupont, WA. 300 baud, online 24 hrs. SysOp: Michael J. Fink. 8/N/1.

(207)532-6287, **The Sacug BBS** -- Houlton, ME. 300 baud, online 9pm-1am, M-F. SysOp: Robert Reece. Commodore.

(207)676-9617, **EERC** -- South Blue Hill, ME. unknown baud, online ?? hrs. SysOp: N. P. Stookey.

(207)725-8456, **Maine Mac Owners** -- Topsham, ME. unknown baud, online ?? hrs. SysOp: Unknown.

(207)854-1365, **Dial-Your-Match -315** -- Westbrook, ME. unknown baud, online ?? hrs. SysOp: Unknown.

(207)865-3004, **Acorn Message Exchange** -- Freeport, ME. 3/12/24 baud, online 24 hrs. SysOp: Anthony Cremonese.

(207)867-2241, **Mid-Coast Maine BBS** -- North Haven, ME. 300/1200 baud, online 9p-noonF&SaEDT. SysOp: Richard Winslow.

(209)432-7265, **West Coast Edition BBS** -- Fresno, CA. 300/1200 baud, online 24 hrs. SysOp: Chuck Mullis.

(209)474-3436, **Bullseye BBS** -- Stockton, CA. 300/1200 baud, online 24 hrs. SysOp: Unknown. FIDO system -- registration required. MS-DOS shareware.

(209)998-5830, **Flea Lemoore** -- Lemoore, CA. 300/1200 baud, online 8pm-7am. SysOp: Vincent McKever. Buy, Sell, & Trade.

(212)219-1758, **Dial-Your-Match -264** -- New York, NY. unknown baud, online ?? hrs. SysOp: Unknown.

(212)250-7090, **Tele-Master:Packetof-NY** -- ???? , NY. 300/1200 baud, online 24 hrs. SysOp: Bill Schimoler.

(212)489-7370, **FOG -15** -- New York City, NY. 300/1200 baud, online 24 hrs. SysOp: Livingston Hinkley. New York Osborne Users' Group (FOG AMO #135) member supported system. **PRACSA member**

(212)547-4210, **After Hours BBS** -- Bronx, NY. 300/1200 baud, online 24 hrs. SysOp: Ed Schaum.

(212)885-0969, **Tele-Master:Women's BB** -- ????, NY. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(212)925-6765, **Dial-Your-Match -286** -- New York, NY. unknown baud, online ?? hrs. SysOp: Unknown.

(213)225-9279, **Dial-Your-Match -52** -- Los Angeles, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(213)328-1846, **Dial-Your-Match -304** -- Torrance, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(213)439-5309, **Dial-Your-Match -367** -- Long Beach, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(213)457-9150, **Dial-Your-Match -164** -- Malibu, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(213)461-9899, **Dial-Your-Match -419** -- Hollywood, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(213)496-4777, **Dial-Your-Match -224** -- Lakewood, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(213)549-9640, **Hughes Aircraft BBS** -- Carson, CA. 300/1200 baud, online 24 hrs. SysOp: Bud Grove. All computers, has RLE graphicsa.

(213)558-4336, **Dial-Your-Match -73** -- Culver City, CA. unknown baud,

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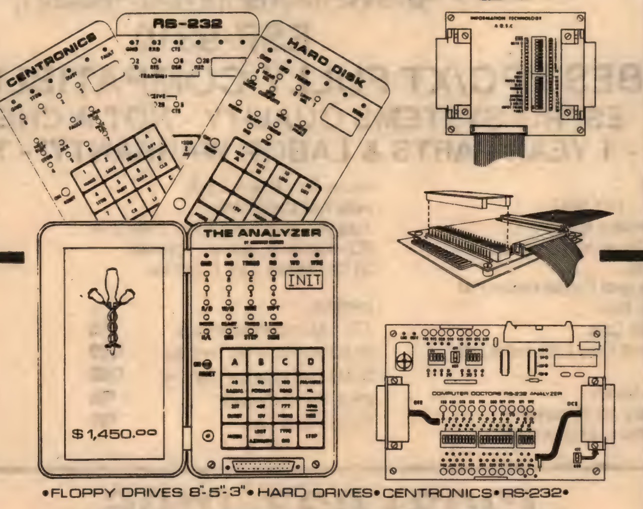

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Bulletin Board

online ?? hrs. SysOp: Unknown.

(213)598-5841, **64 Shopper** -- Long Beach, CA. 300/1200 baud, online 24 hrs. SysOp: Scott Edson.

(213)698-3306, The Dark Side -- Whittier, CA. 300 baud, online 24 hrs. SysOp: Brendon Westhave.

(214)238-1016, **Dallas Connection/PARC** -- Dallas, TX. 3/12/24 baud, online 24 hrs. SysOp: Russell Pencin. PBBS releases. **PRACSA member**

(214)270-6755, **Super CPU** -- Mesquite, TX. 300/1200 baud, online 24 hrs. SysOp: Joe Coker. Sports conferences.

(214)272-2786, **99'er Connection** -- Dallas, TX. 300/1200 baud, online 24 hrs. SysOp: Unknown. Dallas TI Home Computer Group.

(214)357-6446, **Thieve's Underground** -- Dallas, TX. unknown baud, online 24 hrs. SysOp: Unknown.

(214)739-2033, **Alternative London Und** -- Dallas, TX. unknown baud, online ?? hrs. SysOp: Unknown.

(214)742-4247, **Quotron BBS** -- Dallas, TX. unknown baud, online ?? hrs. SysOp: Charles A Thompson.

(214)784-2273, **The Sand Worm RBBS** -- Paris, TX. 3/12/24 baud, online 24 hrs. SysOp: Steve Clifford.

(214)987-2135, **Eclectic BBS** -- Dallas, TX. unknown baud, online ?? hrs. SysOp: Charles A Thompson.

(215)252-8867, **Techie** -- Easton, PA. 300/1200 baud, online 24 hrs. SysOp: Michael E. Mattes.

(215)254-0064, **Devon, PA BBS** -- Devon, PA. 300/1200 baud, online 24 hrs. SysOp: Glenn Mar.

(215)288-0262, **PHUG BBS** -- Philadelphia, PA. 300/1200 8N1 baud, online 24 hrs. SysOp: Rob Cohan. Heath/Zenith & PC Compatible.

(215)295-1864, **The Abstraction** -- Yardley, PA. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(215)356-0860, **N.T.S. PCCS-RCP/M** -- Newton Square, PA. 3/12/24 baud, online 24 hrs. SysOp: Peter M. Essl. Repository for current CP/M & MS-DOS software. **PRACSA member**

(215)372-1726, **Dial-Your-Match –180** -- Reading, PA. unknown baud, online ?? hrs. SysOp: Unknown.

(215)434-3998, **Hermes-84** -- Allentown, PA. 300/1200 baud, online 24 hrs. SysOp: Brice Remaley.

(215)488-7846, **Dial-Your-Match –223** -- Auburn, PA. unknown baud, online ?? hrs. SysOp: Unknown.

(215)698-1905, **Tele-Master: Satronics** -- Philadelphia, PA. 3/12/24 baud, online 24 hrs. SysOp: Mark Miller.

(215)825-6526, **Philly-Match** -- Phildelphia, PA. unknown baud, online ?? hrs. SysOp: Guy Gipson.

(215)965-8331, **Hermes-128** -- Allentown, PA. 300/1200 baud, online 24 hrs. SysOp: Brice Remaley.

(216)327-1099, **Timex Sinclair Users** -- Elyria, OH. unknown baud, online 24 hrs. SysOp: Thomas Simon. Supporting Sinclair and other computers.

(216)481-9476, **Dial-Your-Match –177** -- Cleveland, OH. unknown baud, online ?? hrs. SysOp: Unknown.

(216)661-7825, **Dial-Your-Match –418** -- Cleveland, OH. unknown baud, online ?? hrs. SysOp: Unknown.

(216)729-0625, **The Twin Paradises** -- Cleveland, OH. 300/1200 baud, online 24 hrs. SysOp: Unknown. TRS-80 and Atari.

(216)784-5793, **The Oven BBBS** -- Akron, OH. 300 baud, online 24 hrs. SysOp: Eric Lazar.

(216)944-1072, **TIBBS-Northcoast 99's** -- Cleveland, OH. unknown baud, online ?? hrs. SysOp: Earl Blewitt. TI/99.

(216)953-0336, **The Plains of Abyss** -- Willoughby, OH. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(217)344-4032, **FOG –14** -- Urbana, IL. 300/1200 baud, online 24 hrs. SysOp: Jonathan Block. **PRACSA member**

(217)892-8889, **Network: Atari** -- Rantoul, IL. unknown baud, online 24 hrs. SysOp: Jeff Look. Atari.

(219)422-9180, **The Night Gallery** -- Fort Wayne, IN. 300/1200 baud, online 24 hrs. SysOp: Unknown. C-64.

(219)447-2233, **The Warehouse** -- Fort Wayne, IN. 300/1200 baud, online 24 hrs. SysOp: Kenneth Uhrick. C-128 (C-64 mode).

(301)229-1516, **Micro-City** -- Bethesda, MD. unknown baud, online 9pm till morn. SysOp: Eric Smith.

(301)330-2784, **Dial-Your-Match –230** -- Gaithersburg, MD. unknown baud, online ?? hrs. SysOp: Unknown.

(301)340-1058, **Arcadia** -- Rockville, MD. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari 130XE.

(301)679-6306, Dial-Your-Match –99 -- Joppatowne, MD. unknown baud, online ?? hrs. SysOp: Unknown.

(301)774-5776, **Dial-Your-Match –214** -- Olney, MI. unknown baud, online ?? hrs. SysOp: Unknown.

(301)828-4572, **The Bus MinistryII CFC** -- Baltimore, MD. 300/1200 baud, online 24 hrs. SysOp: Pastor Bob Hoffman.

(301)869-4354, **New FBI BBS** -- Gaithersburg, MD. 300/1200 baud, online 24 hrs. SysOp: David Overeem. Atari 800.

(301)997-7204, **Double Nut Board** -- Simpsonville, MD. 3/12/24 baud, online 24 hrs. SysOp: David N. Elliott. Open access.

(302)322-3999, **TIBBS** -- Newark, DE. unknown baud, online 24 hrs. SysOp: Unknown. DE Valley UG (TI Home computers).

(302)328-7107, **PC-Playtime** -- Wilington, DE. 300/1200 baud, online 24 hrs. SysOp: Steve Ricard. 7/E/1, 8/N/1.

(302)654-2900, **Starfleet Command** -- Elsmere, DE. 3/12/24 baud, online 24 hrs. SysOp: Unknown. Sci-Fi Echomail.

(302)737-7788, **The MouseTrap Pro** -- Newark, DE. 3/12/24 baud, online 24 hrs. SysOp: Online Publishing O. Apple][E.

(303)369-8397, **Stock Market BBS** -- Denver, CO. 3/12/24 baud, online 24 hrs. SysOp: Jim Pritula. Financial Data -- On Line Trading.

(303)392-9635, **Cobra Command Post –1** -- Colorado Springs, CO. 300/1200 baud, online ?? hrs. SysOp: Unknown.

(303)458-6248, **Control Systems BBS** -- Denver, CO. 1200/2400 baud, online 24 hrs. SysOp: Lupe Ramirez. IBM-PC.

(303)471-2415, **FOG –45** -- Colorado Springs, CO. 300/1200 baud, online 24 hrs. SysOp: Ken Moon. Colorado Springs Osborne Group (FOG AMO #133) member supported system. **PRACSA member**

(303)472-0902, **Control Headquarters** -- Colorado Springs, CO. 300 baud, online 24 hrs. SysOp: Unknown.

(303)520-9472, **Kastle Krack** -- Colorado Springs, CO. unknown baud, online ?? hrs. SysOp: Unknown.

(303)548-9519, **Elite Connection** -- Colorado Springs, CO. 300/1200 baud, online 24 hrs: SysOp: Unknown.

(303)574-2567, **Villa-TI** -- Colorado Springs, CO. 300/1200 baud, online ?? hrs. SysOp: Joe Nuvolini. TI-99/4A.

(303)576-8325, **Dream Worldd** -- Colorado Springs, CO. 300/1200 baud, online ?? hrs. SysOp: Unknown.

(303)594-0256, **Air Transit** -- Colorado Springs, CO. 300/1200 baud, online ?? hrs. SysOp: Unknown.

(303)671-7669, **Colorado SnoBank** -- Aurora, CO. 3/12/24 baud, online 24 hrs. SysOp: Unknonwn.

(303)699-6517, **The Proving Grounds** -- Denver, CO. 300/1200 baud, online ?? hrs. SysOp: Unknown.

(303)796-9721, **Dial-Your-Match –118** -- Littleton, CO. unknown baud, online ?? hrs. SysOp: Unknown.

(304)927-1773, **Liberty Bell Network** -- Royal Oak, MI. unknown baud, online 24 hrs. SysOp: Unknown.

(305)254-3196, **Hades BBS** -- Indialantic, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)254-5042, **The Pyrimid** -- Melbourne, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)268-3690, **Alien BBS** -- Titusville, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)268-8576, **Astro BBS** -- Titusville, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)272-6656, **Dial-Your-Match –250** -- Delray Beach, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)439-2136, **The Fortune Cookie BBS** -- Lake Worth, FL. 3/12/24 baud, online 12pm-8pm. SysOp: Blake Levy. IBM.

(305)453-0079, **Nova BBS** -- Merritt Island, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)453-6998, **SCAUG BBS** -- Merritt Island, FL. unknown baud, online 24 hrs. SysOp: Wade Herod.

(305)487-4754, **West Boca Info & S/W** -- Boca Raton, FL. 300/1200 baud, online 24 hrs. SysOp: W. E. Dwinell. Catering to IBM PCs & compatibles but all are welcome.

(305)584-4440, **Pinnacle BBS** -- Hollywood, FL. unknown baud, online ?? hrs. SysOp: Andy Johnson. Multi-user BBS.

(305)584-7466, Pinnacle BBS -- Hollywood, FL. unknown baud, online ?? hrs. SysOp: Andy Johnson. Multi-user BBS.

(305)594-4526, **Adults Only Mansion** -- Miami, FL. unknown baud, online 24 hrs. SysOp: Theodore J. Glass.

(305)621-7434, **Cave BBS** -- Hollywood, FL. 3/12/24 baud, online 24 hrs. SysOp: Ron Marlowe. Miami access.

(305)621-7534, **Miami PC UG BBS** -- Miami, FL. 3/12/24 baud, online 24 hrs. SysOp: Ken Burch. IBM & PC-Board.

(305)631-6844, **Chatterbox** -- Rockledge, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)636-2664, **OnLine BBS** -- Rockledge, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)636-3441, **Discovery** -- Cocoa, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)644-8327, **CFCS BBS** -- Maitland, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)647-8089, **Orlando InterGalactic** -- Orlando, FL. 300/1200 baud, online 24 hrs. SysOp: S. Margadonna. Atari, Commodore, Trivia, Politics, online games, Christian SIG.

(305)671-5913, **The Pigsty** -- Winter Park, FL. 3/12/24 baud, online 24 hrs. SysOp: Richard Marlowe.

(305)722-4321, **ComNet-64 BBS II** -- Tamarac, FL. unknown baud, online 24 hrs. SysOp: Dan Volin. Commodore.

(305)724-2303, **The Quill** -- Palm Bay, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)726-4390, **ComNet-64 BBS** -- Tamarac, FL. unknown baud, online 24 hrs. SysOp: Anne Herold. Commodore.

(305)727-7374, **The War Room** -- Palm Bay, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)729-9575, **The Unicorn** -- Palm Bay, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)734-6026, **Atari CC of Palm Beach** -- Palm Beach, FL. 300 baud, online 24 hrs. SysOp: Unknown. ATASCII only -- Atari Computer Club of the Palm Beaches.

(305)741-5860, **Dial-Your-Match –81** -- Ft. Lauderdale, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)773-1251, **Space Frontiers** -- Melbourne, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)773-5033, **Computer Hustler BBS** -- Eaugale, FL. 300/1200 baud, online ?? hrs. SysOp: Paul Heim. Tandy 1000 and IBM.

(305)777-5278, **The Hangout** -- Melbourne, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(305)793-2975, **Alternate Universe** -- Palm Beach, FL. 300/1200 baud, online 24 hrs. SysOp: Unknown. ATASCII only -- Atari Computer Clubs of the Palm Beaches.

(305)831-6049, **CFCS RCP/M** -- Maitland, FL. unknown baud, online ?? hrs. SysOp: Unknown. Central Florida Computer Society members only.

(305)843-5901, **Dial-Your-Match –337** -- Orlando, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(305)845-6488, **Dial-Your-Match –305** -- North Palm Beach, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(305)935-1136, **Adults Only Clubhouse** -- Miami, FL. unknown baud, online 24 hrs. SysOp: Theodore J. Glass. Adults only material.

(305)961-8685, **Cave BBS** -- Hollywood, FL. 3/12/24 baud, online 24 hrs. SysOp: Ron Marlowe. Ft. Lauderdale access.

(305)981-8173, **Eagle's Nest BBS** -- Hollywood, FL. 3/12/24 baud, online 24 hrs. SysOp: Dan Schoenbaum.

(305)984-2217, **Doghouse BBS** -- Melbourne, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(306)949-1564, **Onyx RCP/M** -- Regina, Sask. 300/1200 baud, online 24 hrs. SysOp: Cris Ball. FOG Remote System #50. **PRACSA member**

(307)875-9214, **Green River BBS** -- Green River, WY. 300 baud, online 24 hrs. SysOp: T. D. Nikkel. 8,1,N. College courses, games, uploads & downloads, business.

(309)342-5486, **E.G.A.D.S!** -- Galesburg, IL. 300/1200 baud, online 24 hrs. SysOp: Tim Brown.

(309)755-6684, **The Trading Post** -- East Moline, IL. 300/1200 baud, online 8pm-2pm. SysOp: Kim Ellis.

(312)235-7902, **CFOG –2** -- Chicago, IL. 3/12/24 baud, online 24 hrs. SysOp: Bill Kuykendall. Chicago FOG (FOG AMO #80) member supported system. **PRACSA member**

(312)243-5135, Dial-Your-Match –39 -- Chicago, IL. unknown baud, online ?? hrs. SysOp: Unknown.

(312)252-2136, **Logan Square** -- Chicago, IL. unknown baud, online ?? hrs. SysOp: Earl Bockenfeld.

(312)282-9272, **Ski's Lodge** -- Chicago, IL. 300/1200 baud, online 24 hrs. SysOp: Dan Majewski. Apple][e.

(312)289-4973, **Dial-Your-Match –59** -- Schaumburg, IL. unknown baud, online ?? hrs. SysOp: Unknown.

(312)326-4392, **CPM3 RCP/M** -- Chicago, IL. 300/1200 baud, online 24 hrs. SysOp: Dick Lieber.

(312)351-1588, **Dial-Your-Match –98** -- Roselle, IL. unknown baud, online ?? hrs. SysOp: Unknown.

(312)359-8080, **Palatine RCP/M** -- Palatine, IL. 300/1200 baud, online 24 hrs. SysOp: Tim Cannon.

(312)384-0013, **Xerox Midwest** -- Chicago, IL. 300/1200 baud, online 24 hrs. SysOp: David Lowy.

(312)384-2320, **CACHE Lobo-80** -- Chicago, IL. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(312)420-1722, **DigiTec Znode (tm)** -- Lisle, IL. 3/12/24 baud, online 24 hrs. SysOp: Unknown.

(312)430-4477, **The Switchboard** -- Hickory Hills, IL. 300 baud, online 24 hrs. SysOp: Ken Morrison.

(312)459-5721, **CATUG** -- Chicago, IL. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(312)459-9331, **Incomm's Turbo Board** -- Wheeling, IL. 3/12/24 baud, online ?? hrs. SysOp: Brad Grinstead. IBM.

(312)523-4904, **Dial-Your-Match –295** -- Chicago, IL. unknown baud, online ?? hrs. SysOp: Unknown.

(312)545-8086, **CBBS –1** -- Chicago, IL. 3/12/24 baud, online 24 hrs. SysOp: Unknown.

(312)623-2226, **Waukegan Public Librar** -- Waukegan, IL. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(312)649-1730, **Z-System Znode (tm)** -- Chicago, IL. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(312)690-3808, **Ampro 4 RCP/M** -- Chicago, IL. 3/12/24 baud, online 24 hrs. SysOp: Jim Mills.

(312)729-0556, **Ham Radio BBS** -- Chicago, IL. 300 baud, online ?? hrs. SysOp: Unknown.

(312)729-2101, **IBMPC/Business BBS** -- Chicago, IL. 300/1200 baud, online 24 hrs. SysOp: Les Multack.

(312)769-2020, **20/20 BBS** -- Chicago, IL. 300/1200 baud, online 24 hrs. SysOp: Unknown. Commodore.

(312)789-0499, **Hinsdale RCP/M** -- Chicago, IL. 3/12/24 baud, online 24 hrs. SysOp: Mark Pulver. $$$$ Subscription service only.

(312)841-6519, **Dial-Your-Match –102** -- Riverdale, IL. unknown baud, online ?? hrs. SysOp: Unknown.

(312)848-3669, **Apple SIG 'Cider Press** -- Chicago, IL. 300 baud, online 24 hrs. SysOp: Larry McMahon.

(312)849-1132, **Dolton CBBS** -- Chicago, IL. 3/12/24 baud, online 24 hrs. SysOp: Ward Christensen.

(312)896-9628, **The B.A.S.I.C. BBS** -- Aurora, IL. 300-1200 baud, online 3pm-11pm. SysOp: Steven Lorenz. TRS-80.

(312)897-6532, **Computer Solutions** -- Aurora, IL. 300/1200 baud, online 24 hrs. SysOp: Bill Slaker.

(312)922-3626, **F.O.C. the BBS** -- Chicago, IL. 300/1200 baud, online 24 hrs. SysOp: Bill Eng. Financial news.

(312)983-5147, **Sun Valley RCP/M** -- Lisle, IL. 3/12/24 baud, online 24 hrs. SysOp: K Stritzel.

(313)278-1727, **Crazy House** -- Detroit, MI. 3/12/24 baud, online 24 hrs. SysOp: Unknown. Atari/Advanced A.M.I.S..

(313)334-8877, **The Club II** -- Pontiac, MI. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari ST, TRS.

(313)420-0407, **Molin's Den** -- Northville, MI. 300/1200 baud, online 24 hrs. SysOp: Michael Olin. Atari/Advanced A.M.I.S..

(313)427-1115, **TFA BBS** -- Livonia, MI. 3/12/24 baud, online 24 hrs. SysOp: William.

(313)443-0365, **DeFOG's RBBS-RCP/M** -- Detroit, MI. 300/1200 baud, online 24 hrs. SysOp: Bill Rice. FOG Remote System #26 -- Detroit FOG (FOG AMO #14) member supported system. **PRACSA member**

(313)525-5172, **Baudville** -- Garden City, MI. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari/Advanced A.M.I.S..

(313)543-8349, Mace Superboard -- Royal Oak, MI. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari ST.

(313)582-0657, **Mace West** -- Dearborn, MI. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari/Advanced A.M.I.S..

(313)736-1398, **Dial-Your-Match –37** -- Flint, MI. unknown baud, online ?? hrs. SysOp: Unknown.

(313)849-0499, **Dial-Your-Match –231** -- Detroit, MI. unknown baud, online ?? hrs. SysOp: Unknown.

(313)949-6745, **Microchip BBS** -- Mt. Clemens, MI. 3/12/24 baud, online 24 hrs. SysOp: Dave Marker. Downloads for all computers.

(313)978-1685, **Magic-Amis BBS** -- Warren, MI. unknown baud, online 24 hrs. SysOp: M. Lechkun. Atari.

(315)699-6263, **Dial-Your-Match –279** -- Clay, NY. unknown baud, online ?? hrs. SysOp: Unknown.

(315)895-7951, **Ilion Data Sciences** -- Ilion, NY. unknown baud, online 24 hrs. SysOp: Nick Dudish.

(317)452-1535, **Bible Bulletin Board** -- Galveston, IN. 3/12/24 baud, online 24 hrs. SysOp: Tony Capoccia.

(317)482-1079, **The Gatorboard** -- Lebanon, IN. 300/1200 baud, online 10pm-8am. SysOp: Derk Gates. TRS-80 Color Comp.

(317)842-2208, **IBM PC Users Group Inc** -- Indianapolis, IN. 3/12/24 baud, online ?? hrs. SysOp: Unknown.

(318)474-6144, **Bayou TIBBS** -- Lake Charles, LA. 300/1200 baud, online 24 hrs. SysOp: Roger Hickerson.

(319)326-3904, **FOG –25** -- Davenport, IA. 300/1200 baud, online 24 hrs. SysOp: Matthew Reed. Quad City Osborne Group (FOG AMO #102) member supported system. **PRACSA member**

(401)683-5482, **The Underground** -- Newport, RI. 3/12/24 baud, online ??

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Bulletin Board

hrs. SysOp: Michael R. Dutton. Animated color graphics, all users welcome.

(402)477-0293, **Dial-Your-Match –326** -- Lincoln, NE. unknown baud, online ?? hrs. SysOp: Unknown.

(402)556-4241, **Dial-Your-Match –116** -- Omaha, NE. unknown baud, online ?? hrs. SysOp: Unknown.

(402)734-4748, **Dial-Your-Match –114** -- Omaha, NE. unknown baud, online ?? hrs. SysOp: Unknown.

(403)280-9900, **Formula Coco** -- Alberta, Canada. 300/1200 baud, online 24 hrs. SysOp: Bill Boogaart. 7 bit, Even parity.

(404)354-0662, **FOG –27** -- Athens, GA. 300/1200 baud, online 24 hrs. SysOp: Bob Herrin. Computer User Group of Athens (FOG AMO #81) member supported system. **PRACSA member**

(404)366-1914, **A9CUG** -- Atlanta, GA. unknown baud, online ?? hrs. SysOp: Unknown.

(404)446-3968, **Dial-Your-Match –335** -- Atlanta, GA. unknown baud, online ?? hrs. SysOp: Unknown.

(404)546-8256, **Channel 33** -- Athens, GA. 300 baud, online 24 hrs. SysOp: Ric Helton. Atari.

(404)934-0188, **Atlanta Computer Soc.** -- Atlanta, GA. unknown baud, online ?? hrs. SysOp: Unknown.

(404)991-6250, **A9CUG** -- Atlanta, GA. unknown baud, online ?? hrs. SysOp: Unknown.

(405)692-1061, **Tinker Atari Comp Enth** -- Oklahoma City, OK. 300/1200 baud, online 24 hrs. SysOp: Michael E. Beard. Atari oriented.

(405)733-3102, **MidWest MIDI BBS** -- Midwest City, OK. 1200 baud, online 24 hrs. SysOp: John Fordenbacher. All computers & all person interested in MIDI and music.

(405)848-5317, **Constitutional Pathway** -- Oklahoma City, OK. 300/1200 baud, online 24 hrs. SysOp: Whitney Boutin. FOG Remote System #13 -- Oklahoma CP/M Users' Group (FOG AMO #67) member supported system. **PRACSA member**

(408)225-8623, **Mac XL** -- San Jose, CA. 300/1200 baud, online ?? hrs. SysOp: William Renfro. Mac XL.

(408)238-9621, **Servu** -- San Jose, CA. 3/12/24 baud, online 24 hrs. SysOp: Al Mehr. CP/M80, CP/M86, Macintosh, PC-DOS, MS-DOS software. **PRACSA member**

(408)245-1420, **ZEE Machine** -- Sunnyvale, CA. 3/12/24 baud, online 24 hrs. SysOp: Norman L. Beeler. Public Domain Software. **PRACSA member**

(408)253-1309, **Digikron Systems** -- San Jose, CA. 3/12/24 baud, online 24 hrs. SysOp: Douglas Thom. ZCPR3 & Apple CP/M & Macintosh. **PRACSA member**

(408)262-5150, DC to Light -- San Jose, CA. 300/1200 baud, online 24 hrs. SysOp: Fred Townsend. Heath/Zenith software, general interest. **PRACSA member**

(408)262-7177, **SpaceNET** -- Milpitas, CA. 300/1200 baud, online 24 hrs. SysOp: Bill Dale. Space Frontier SIG. **PRACSA member**

(408)354-5934, **Saratoga PBBS** -- Saratoga, CA. 300/1200 baud, online 24 hrs. SysOp: Chuck Metz. Public domain software and technical information exchange. **PRACSA member**

(408)559-8843, **MicroResearch Rem Sys** -- Campbell, CA. 300/1200 baud, online 24 hrs. SysOp: Mitchell Orysh. Software exchange. **PRACSA member**

(408)674-3439, **Elmer II** -- Salinas Valley, CA. unknown baud, online 7am-7pm PST. SysOp: Rich Pitts. Ham Radio oriented, all users welcome.

(408)720-0724, **Dial-Your-Match –296** -- Sunnyvale, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(408)720-9212, **Bizcomp BBS** -- Sunnyvale, CA. 300/1200 baud, online 24 hrs. SysOp: Howard Stateman. Modem technical support. **PRACSA member**

(408)733-4670, **B.A.S.I.S. BBS** -- Sunnyvale, CA. 3/12/24 baud, online 24 hrs. SysOp: Clay Walker. User group members and invited guests. **PRACSA member**

(408)733-6266, **Dial-Your-Match –268** -- Sunnyvale, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(408)736-7356, **Dial-Your-Match –56** -- Sunnyvale, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(408)867-6575, **Eigenware (tm)** -- Saratoga, CA. 300/1200 baud, online 24 hrs. SysOp: Karl L. Remmler. BBS & Database for programmers. **PRACSA member**

(408)947-8038, **Wild Bill's** -- San Jose, CA. 300/1200 baud, online 24 hrs. SysOp: Bill Strouse. Trail Information Volunteer Center (TIVC) listing bicycle, jogging, and horse activities. **PRACSA member**

(412)321-7262, **Camelot** -- Pittsburgh, PA. unknown baud, online 24 hrs. SysOp: Davin Flateau.

(412)344-1315, **Proteen CFC** -- Pittsburgh, PA. 3/12/24 baud, online 24 hrs. SysOp: Pastor Bob Hoffman.

(412)531-0137, **LimeLight BBS** -- Pittsburgh, PA. unknown baud, online 24 hrs. SysOp: Susan & Ron Molnar.

(412)741-4232, **Biotechnology** -- Pittsburgh, PA. unknown baud, online 24 hrs. SysOp: Gary Dale.

(412)962-9514, **Beacon Hill BBS** -- Transfer, PA. 300/1200 baud, online 24 hrs. SysOp: Stephen Bross. Commodore.

(413)774-5751, **Wizard's Domain** -- Greenfield, MA. unknown baud, online 10p6aM-F11p6aS. SysOp: Unknown. C-64.

(415)261-4813, **Laser BBS Shopping Mal** -- Oakland, CA. 300/1200 baud, online 24 hrs. SysOp: Tom Allen.

(415)285-2687, **KAY*FOG** -- San Francisco, CA. 300/1200 baud, online 24 hrs. SysOp: Bond Shands. Novices and subject (dBASE, WordStar, MEX, etc) conferences -- mail registration required. **PRACSA member**

(415)323-4579, **SMOG3 (FOG 40)** -- Menlo Park, CA. 3/12/24 baud, online 24 hrs. SysOp: Philip A. Moore. SMOG3 (FOG AMO #68) member supported system. **PRACSA member**

(415)349-8245, **Cats Tail Headquarters** -- San Mateo, CA. 300/1200 baud, online 24 hrs. SysOp: Bill Bennett.

(415)364-3739, **Anatomically Correct** -- Atherton, CA. 300/1200 baud, online 24 hrs. SysOp: Howard Stateman. Adult interests. **PRACSA member**

(415)365-2650, **Emerald Lake (FOG 48)** -- Redwood City, CA. 3/12/24 baud, online 24 hrs. SysOp: Dick Worth. **PRACSA member**

(415)383-0473, **Marin RBBS** -- Mill Valley, CA. 300 - 710 baud, online 5p-8a (S/S 24). SysOp: Jim Ayers. CP/M and Otrona Attache. **PRACSA member**

(415)447-2247, **Alpha Omega 80** -- Livermore, CA. 300/1200 baud, online 24 hrs. SysOp: Scott Church.

(415)484-4412, **Mac Circles BBS** -- Pleasanton, CA. 3/12/24 baud, online 24 hrs. SysOp: Unknown.

(415)489-2572, **Dial-Your-Match –341** -- Hayward, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(415)489-9005, ZCPR3 BBS/Z-Node Centr -- Fremont, CA. 3/12/24 baud, online 24 hrs. SysOp: David McCord. Source of ZCPR3 software & support. **PRACSA member**

(415)564-1861, **SFCAL RCP/M node 2** -- San Francisco, CA. 300/1200 baud, online 24 hrs. SysOp: James Parkenson.

(415)572-8219, **Kay*Fun** -- San Mateo, CA. 300/1200 baud, online 24 hrs. SysOp: Ernest Hintz. CP/M software and messages. System supported by Kayfun members. **PRACSA member**

(415)574-3663, **TechNet** -- San Carlos, CA. 3/12/24 baud, online 24 hrs. SysOp: Eric R. Daniel. MS-/PC-DOS software, communications, engineering, AutoCAD & ham radio SIGs. **PRACSA member**

(415)574-7684, San Mateo, CA. 300/1200 baud, online ?? hrs. SysOp: Unknown. San Mateo TRS-80 User Group BBS (8/N/1).

(415)591-6259, **FOG – 4** -- Belmont, CA. 3/12/24 baud, online 24 hrs. SysOp: Roy Robinson. CP/M & MS-DOS support. **PRACSA member**

(415)595-2479, **FAUG BBS** -- San Carlos, CA. 300/1200 baud, online 24 hrs. SysOp: Timothy Avery. Amiga owners.

(415)595-5079, **TechNet** -- San Carlos, CA. 3/12/24 baud, online 24 hrs. SysOp: Eric R. Daniel. MS-/PC-DOS software, communications, engineering, AutoCAD & ham radio SIGs. **PRACSA member**

(415)655-1206, **FOG –33** -- Oakland, CA. 300/1200 baud, online 24 hrs. SysOp: Kenji Nakadegawa. East Bay FOG (FOG AMO #3) member supported system. **PRACSA member**

(415)665-0528, **SFCAL RCP/M** -- San Francisco, CA. 300/1200 baud, online 24 hrs. SysOp: Bob Baker.

(415)692-1861, **WestWind BBS** -- Millbrae, CA. 300/1200 baud, online 24 hrs. SysOp: Yati Sahae. Support of WestWind customers. **PRACSA member**

(415)755-2030, **FOG – 1** -- Daly City, CA. 3/12/24 baud, online 24 hrs. SysOp: Gale Rhoades. Distribution of FOG Disk Library. FOG or PRACSA membership required for access to download area. **PRACSA member**

(415)755-8315, **FOG – 6** -- Daly City, CA. 3/12/24 baud, online 24 hrs. SysOp: Jack Brown. Technical information and FOG uploads -- open to the public. **PRACSA member**

(415)792-3481, **FOG –38** -- Newark, CA. 3/12/24 baud, online 24 hrs. SysOp: Gerald Wright. **PRACSA member**

(415)829-9493, **Alpha Omega** -- Dublin, CA. 300/1200 baud, online 24 hrs. SysOp: Scott Church.

(415)845-2164, **Berkeley Mega-Monster** -- Berkeley, CA. 3/12/24 baud, online 24 hrs. SysOp: Tony Adams. CP/M and MS-DOS public domain software. **PRACSA member**

(415)851-7732, **King's Mountain** -- Woodside, CA. 300/1200 baud, online 24 hrs. SysOp: Troy Soult. FOG #12 -- mainly MS-DOS software. **PRACSA member**

(415)856-2771, **TeleTech** -- Palo Alto, CA. 300/1200 baud, online 24 hrs. SysOp: Freeman Bradford. Hobby. **PRACSA member**

(415)895-0135, **Open Campus (GBBS)** -- San Leandro, CA. 300/1200 baud, online 24 hrs. SysOp: Robert Shayler. Sponsored by San Leandro High School & Apple Eaters Users Group.

(415)938-9470, **Co-Ed Associates** -- Walnut Creek, CA. 3/12/24 baud, online 24 hrs. SysOp: Werner L. Gumpert. Software exchange. **PRACSA member**

(415)939-1246, **Model 100, 102, 200** -- Pleasant Hill, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(415)948-2513, **PRACSA** -- Los Altos Hills, CA. 300/1200 baud, online 24 hrs. SysOp: Irv Hoff. PRACSA-member only system. **PRACSA member**

(415)964-3255, **Dial-Your-Match –56A** -- Mountain View, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(415)964-9039, **SPACE** -- Stanford, CA. 300/1200 baud, online 24 hrs. SysOp: Jay Fox. MS-DOS (N,8,1).

(415)965-4097, **Mt. View RCP/M** -- Mountain View, CA. 300/1200 baud, online 24 hrs. SysOp: Byron McKay. BBS open to the public. CP/M 80, 86, and 68K emphasis. **PRACSA member**

(415)966-5319, **The Office** -- Moffett Field, CA. 300/1200 baud, online 4pm-7:30am M-F. SysOp: John Allen. Pass information to new computers in the Navy. **PRACSA member**

(415)991-4000, Dial-Your-Match –17 -- Daly City, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(417)732-7636, **Orphan Board** -- Republic, MO. 300 baud, online 24 hrs. SysOp: Jerry L. Campbell. TI 99/4.

(417)864-8546, **The DGS^5>**Express -- Springfield, MO. 300/1200 baud, online 24 hrs. SysOp: David Stern. XModem Uploads and Downloads.

(417)869-5294, **The Computer Matrix** -- Springfield, MO. 3/12/24 baud, online 24 hrs. SysOp: James Morris.

(419)485-4681, **Stealth Base BBS** -- Montpelier, OH. unknown baud, online 8pm-8am (EST). SysOp: D. Dominique.

(419)697-6635, **Dial-Your-Match –280** -- Spencerville, OH. unknown baud, online ?? hrs. SysOp: Unknown.

(501)224-9454, **ROSBBS LR** -- Little Rock, AR. 300/1200 baud, online 24 hrs. SysOp: Elmer Wingfield. CP/M-MS/DOS.

(501)470-0624, **C.I.A. BBS** -- Mayflower, AR. unknown baud, online 24 hrs. SysOp: Tim Grooms. Commodore.

(501)636-2281, **A.I.M. Online BBS** -- Rogers, AR. 300/1200 8N1 baud, online 24 hrs. SysOp: Jerry Hunter. MS-DOS -- Software exchange, realtime catalog of H/W & S/W at wholesale prices, electronic mail, etc.

(501)857-3138, **COBBS –41** -- Corning, AR. 1200 baud, online 8am-8pm (CST). SysOp: Perry Parsons.

(502)241-4109, **Soft Stone** -- Louisville, KY. 300/1200 baud, online 24 hrs. SysOp: Curt Edwards. FOG Remote System #24. **PRACSA member**

(502)439-4007, **Owl's Nest** -- Fort Campell, KY. unknown baud, online 24 hrs. SysOp: Unknown.

(502)439-6968, **Savage** -- Fort Campell, KY. unknown baud, online 24 hrs. SysOp: Unknown.

(502)885-5429, **Hacknet America** -- Hopkinsville, KY. 300/1200 baud, online 7pm-7am. SysOp: Unknown.

(503)754-1376, **Microtext** -- Corvalis, OR. 300/1200 baud, online 24 hrs. SysOp: Chuck Gee. $$$$ For profit system.

(503)839-1160, **Alton RCP/M** -- Eureka, CA. 3/12/24 baud, online 24 hrs. SysOp: Unknown. 8/N/1.

(504)295-3336, **Dial-Your-Match –402** -- Baton Rouge, LA. unknown baud, online ?? hrs. SysOp: Unknown.

(504)348-4493, **WBUG II** -- New Orleans, LA. unknown baud, online ?? hrs. SysOp: Lionel Flotte.

(504)684-3244, **The Towne Crier BBS** -- Church Point, LA. 300 baud, online 9pm-6am. SysOp: Ricky Venable.

(504)738-3600, **NOAUG BBS** -- New Orleans, LA. unknown baud, online ?? hrs. SysOp: Ken Livaudais. Atari.

(504)769-4969, **BatonRouge Supersystem** -- Baton Rouge, LA. 300/1200 baud, online 24 hrs. SysOp: John Nastasi. Atari ST.

(504)851-4857, **The Curtain Call TBBS** -- Houma, LA. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(505)298-0955, **Mountain View BBS** -- Albuquerque, NM. unknown baud, online 8pm - 7am. SysOp: Greg Morken. IBM.

(505)392-2447, **Midnight Thinking BBS** -- Hobbs, NM. unknown baud, online ?? hrs. SysOp: Bill Porter. IBM, Apple, Tandy, Search & Rescue, Real Estate, Atari, Commodore, PD software, for sale.

(505)434-3082, **Dial-Your-Match –104** -- Alamogordo, NM. unknown baud, online ?? hrs. SysOp: Unknown.

(505)437-3749, **Dial-Your-Match –211** -- Alamogordo, NM. unknown baud, online ?? hrs. SysOp: Unknown.

(505)869-3546, **Dial-Your-Match –133** -- Bosque Farms, NM. unknown baud, online ?? hrs. SysOp: Unknown.

(505)885-6516, **The Viking's Castle** -- Carlsbad, NM. 300/1200 baud, online 24 hrs. SysOp: Alice McDonald. C64.

(505)988-5867, **Santa Fe Message** -- Santa Fe, NM. 3/12/24 baud, online

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online ?? hrs. SysOp: Unknown.

(619)727-6431, **Dial-Your-Match -148** -- Vista, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(619)741-1377, **Dial-Your-Match -205** -- Escondido, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(619)746-6751, **Dial-Your-Match -225** -- Escondido, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(701)746-5932, **The Frozen Banana** -- Grand Forks, ND. 3/12/24 baud, online 24 hrs. SysOp: Arthur F. Hebbeler.

(702)553-2758, **DTJ6 Vicuna's Cave** -- Beatty, NV. 300 baud, online 24 hrs. SysOp: Unknown.

(702)646-4111, **Independant Prog Guild** -- Las Vegas, NV. unknown baud, online ?? hrs. SysOp: Unknown.

(703)387-1780, **Dial-Your-Match -394** -- Salem, VA. unknown baud, online ?? hrs. SysOp: Unknown.

(703)786-6577, **Redline's Garage BBS** -- Fredericksburg, VA. 3/12/24 baud, online 24 hrs. SysOp: Joe McAllister.

(703)893-7166, **Commodore's Fastrack** -- McLean, VA. unknown baud, online 24 hrs. SysOp: Harry M. Padbury. C64.

(704)255-0032, **Access BBS** -- Asheville, NC. 300/1200 baud, online 24 hrs. SysOp: Bill Hines. ?? & TBBS.

(704)484-3019, **Diver's Domain BBS** -- Shelby, NC. 300/1200 baud, online 24 hrs. SysOp: Robert Stone. Commodore only -- uploading & downloading.

(704)552-7480, **XLR8ED BBS** -- Charlotte, NC. 300/1200 baud, online ?? hrs. SysOp: Joe Venturelli.

(704)728-8534, **Hudson Area C-64 BBS** -- Hudson, NC. 300/1200 baud, online 24 hrs. SysOp: Benny Hayslett. C-64 Color/Graphic.

(707)528-7753, **Dial-Your-Match -245** -- Santa Rosa, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(707)557-4403, **Vallejo RCP/M (FOG 18)** -- Vallejo, CA. 300/1200 baud, online 24 hrs. SysOp: Ron Forsythe. CP/M and MS-DOS. **PRACSA member**

(707)576-7352, **Time Arts, Inc** -- Santa Rosa, CA. 300/1200 baud, online 24 hrs. SysOp: Unknown. Lumena Users.

(707)964-7172, **MCAB** -- Fort Bragg, CA. 300/1200 baud, online ?? hrs. SysOp: Manuel Martinez.

(713)527-8566, **Montrose Mailbox** -- Houston, TX. 3/12/24 baud, online 24 hrs. SysOp: Osa Lott. 8/N/1.

(713)528-7017, **CHUG BBS** -- Houston, TX. unknown baud, online ?? hrs. SysOp: Unknown.

(713)556-9341, **Dial-Your-Match -266** -- Houston, TX. unknown baud, online ?? hrs. SysOp: Unknown.

(713)771-9422, **The Outdoors Man** -- Houston, TX. 300/1200 baud, online 7p-5aM-F/24S-S. SysOp: John Bennett.

(713)873-0403, **Info-Net/Police-Net** -- Houston, TX. 1200 baud, online 24 hrs. SysOp: Alan Bragg. Commodore C-64.

(713)963-0262, **Dial-Your-Match -242** -- Houston, TX. unknown baud, online ?? hrs. SysOp: Unknown.

(714)534-6467, **Dial-Your-Match -207** -- Garden Grove, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(714)739-8822, **Dial-Your-Match -224** -- Buena Park, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(714)751-4860, **Dial-Your-Match -130** -- Santa Ana, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(714)772-4097, **Amiga-Line** -- Anaheim, CA. 300/1200 baud, online 24 hrs. SysOp: Tom Jacobsen. Amiga.

(714)778-0948, **RBBS-Anaheim** -- Anaheim, CA. 3/12/24 baud, online 24 hrs. SysOp: David Kleinschmidt. IBM-PC.

(714)857-2470, **Dial-Your-Match -29** -- Irvine, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(716)283-2362, **Dial-Your-Match -390** -- Niagara Falls, NY. unknown baud, online ?? hrs. SysOp: Unknown.

(716)627-3490, **Lake View Area TIBBS** -- Lake View, NY. unknown baud, online 24 hrs. SysOp: Rick Dase. TI.

(716)731-3152, Dial-Your-Match -298 -- Sanborn, NY. unknown baud, online ?? hrs. SysOp: Unknown. Also Dial-Your-Match #239.

(716)823-1624, **Dial-Your-Match -370** -- West Seneca, NY. unknown baud, online ?? hrs. SysOp: Unknown.

(716)833-0316, **Tower of Zot** -- Buffalo, NY. unknown baud, online 24 hrs. SysOp: Unknown. Apple/Adam.

(716)889-3571, **Dial-Your-Match -259** -- Rochester, NY. unknown baud, online ?? hrs. SysOp: Unknown.

(717)454-4220, **Mission:Impossible BBS** -- Hazelton, PA. 300 baud, online 24 hrs. SysOp: Rich Green.

(717)645-4992, **The Paranormal BBS** -- Lansford, PA. unknown baud, online 9pm - 9am. SysOp: Chris Caldwell.

(717)657-8699, **FOG -10** -- Harrisburg, PA. 3/12/24 baud, online 24 hrs. SysOp: George Peace. CP/M + software. **PRACSA member**

(718)743-2434, **EntrePlex** -- Brooklyn, NY. 300/1200 baud, online 24 hrs. SysOp: Larry Alexander. For Entrepreneurs.

(718)746-1140, **Tele-Master:Online Sys** -- ????, NY. 3/12/24 baud, online 24 hrs. SysOp: George Mihalios.

(718)963-2189, **Tele-Master: F.C.C.** -- ????, NY. 300/1200 baud, online 24 hrs. SysOp: Richard Ho.

(800)564-1656, **MCAB** -- Fort Bragg, CA. 300/1200 baud, online ?? hrs. SysOp: Manuel Martinez. California callers only.

(801)254-4514, **Laird's Lair** -- Salt Lake City, UT. unknown baud, online ?? hrs. SysOp: Unknown.

(801)272-5049, **Zig-Zag BBS** -- Salt Lake City, UT. unknown baud, online ?? hrs. SysOp: Unknown.

(801)277-2700, **C.P.U.** -- Salt Lake City, UT. unknown baud, online ?? hrs. SysOp: Unknown.

(801)466-6954, **Motel West** -- Salt Lake City, UT. unknown baud, online ?? hrs. SysOp: Unknown.

(801)485-6349, **Want Ads** -- Salt Lake City, UT. unknown baud, online ?? hrs. SysOp: Unknown.

(801)521-5966, **BBS of No Return** -- Salt Lake City, UT. unknown baud, online ?? hrs. SysOp: Unknown.

(801)943-0955, **Flaming Fortress** -- Salt Lake City, UT. unknown baud, online ?? hrs. SysOp: Unknown.

(801)943-2011, **Underware II** -- Salt Lake City, UT. unknown baud, online ?? hrs. SysOp: Unknown.

(803)238-3037, **Dial-Your-Match -409** -- Myrtle Beach, SC. unknown baud, online ?? hrs. SysOp: Unknown.

(803)293-3358, **Dial-Your-Match -322** -- Myrtle Beach, SC. unknown baud, online ?? hrs. SysOp: Unknown.

(803)366-6235, **Critical Mass BBS** -- Rock Hill, SC. 3/12/24 baud, online 24 hrs. SysOp: John Threatt. Amiga, BBS-PC.

(803)449-5945, **Dial-Your-Match -375** -- Myrtle Beach, SC. unknown baud, online ?? hrs. SysOp: Unknown.

(803)548-1243, **The Board Room** -- Fort Mill, SC. 300/1200 baud, online 24 hrs. SysOp: David Western.

(803)585-8575, **The Alliance Francaise** -- Spartanburg, SC. 3/12/24 baud, online 24 hrs. SysOp: Pascal Roy. Promotion of French language and culture.

(803)591-0312, **Animated Prism** -- Spartanburg, SC. 300/1200 baud, online 6-12pM-Th24F-S. SysOp: Unknown. Spartanburg Commodore Users Group.

(803)763-4920, **Charleston Fido** -- Charleston, SC. 300/1200 baud, online 24 hrs. SysOp: Ed Ridpath. DEC Rainbow.

(803)776-8447, **Dial-Your-Match -171** -- Fort Jackson, SC. unknown baud, online ?? hrs. SysOp: Unknown.

(804)737-8275, **Dial-Your-Match -272** -- Highlands Springs, VA. unknown baud, online ?? hrs. SysOp: Unknown.

(804)747-0041, **Skeleton Island** -- Richmond, VA. 300/1200 baud, online ?? hrs. SysOp: Unknown.

(804)873-2316, **Master's Syslink** -- Williamsburg, VA. 300/1200 baud, online 24 hrs. SysOp: Unknown. TRS-80.

(804)874-5107, **The Weather BBS** -- Newport News, VA. 300/1200 baud, online 24 hrs. SysOp: Unknown. MS-DOS.

(804)877-7141, **Volksboard TBBS** -- Williamsburg, VA. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(804)898-7493, **Oxgate RC/PM** -- Williamsburg, VA. 300/1200 baud, online 24 hrs. SysOp: Unknown. CP/M.

(805)256-4215, Dial-Your-Match -345 -- Rosamond, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(805)264-2228, **Dial-Your-Match -275** -- Lancaster, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(805)496-7093, **The Connector** -- Westlake Village, CA. 3/12/24 baud, online 24 hrs. SysOp: Unknown. Dating and Networking.

(805)943-8737, **Hi Desert Apple GBBS** -- Lancaster, CA. 300 baud, online 24 hrs. SysOp: Kevin Taunton. Apple.

(806)383-2270, **Golden Spread Data Exc** -- Amarillo, TX. unknown baud, online 24 hrs. SysOp: Herman Green. TI Users.

(808)254-3369, **Hawaii TRS80 U. G.** -- Honolulu, HI. unknown baud, online ?? hrs. SysOp: Alan Krassner. TRS-80.

(808)499-2258, **Superboard Two** -- Ewa Beach, HI. 300/1200 baud, online 24 hrs. SysOp: Gene Ponce. Commodore.

(808)841-3158, **Dial-Your-Match -190** -- Honolulu, HI. unknown baud, online ?? hrs. SysOp: Unknown.

(812)331-1270, **Monk's Hood BBS** -- Bloomington, IN. unknown baud,

IBM	Price	Atari ST					
Ability	59.95	10th Frame	23.97	Sticky Bear Typing	23.97	Personal Accountant	20.97
Carbon Copy	117.00	3 D Helicopter Simulator	29.97	The Hobbit	20.97	Pitfall II	17.97
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Disk Optimizer	29.97	Art Gallery II	17.97	Vico Joystick	23.97	Print Shop	26.97
Dollars & Sense	107.95	Bridge 4.0	17.97	Macintosh		Print Shop Companion	20.97
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JK Lasser's Income Tax 1986	41.97	Halta View	44.97	Dollars & Sense	89.97	Rally Speedway	17.97
Lattice C (V 3.0)	300.00	Haba Writer	44.97	Easy 3 D	59.60	Road Rally USA	20.95
Multimate Advantage	357.00	Hacker	26.97	Electric Checkbook	50.00	$ Porter 128 Per Finance	41.97
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Reflex	89.97	Super Huey	23.97	Mac Type	29.97		
Sideways	41.97	Thunder	23.97	Microsoft Word (V 1.05)	117.00		
Sidekick	32.97	Timelink	29.97	Millionaire	35.97		
Spotlight	50.00	Ultima II.	38.97	Mindshadow	26.97		
Turbo Graphix Toolbox	32.97	Video Digitizer	109.16	Printworks for the Mac	45.00		
Turbo Lighting	59.95	Commodore		Sidekick W/Phonelink	59.97		
Turbo Pascal (V 3.0)	41.97	3D Art Package	8.97	The Hobbit	23.97		
Volkswriter 3 (V2.2)	171.00	6 Pack Scenery Disk	64.97				
Word Perfect	188.00	B-1 Nuclear Bomber	12.60				
Word Star 2000 (V.2.0)	297.00	Bank Street Filer	29.97				
Word Star 2000+ (V 2.0)	357.00	Bank Street Writer	29.97				
dBaseIII Plus	375.00	Beach Head	20.97				
APPLE		Beach Head II	23.97				
Algebra 1	24.00	Computer Quarterback	23.97				
Algebra 2	24.00	Conflict in Vietnam	23.97				
Algebra 3	24.00	Disk Drive Manager	4.20				
Algebra 4	24.00	Double Fire Joystick(Kraft)	7.17				
Applesoft Compiler (V3.0)	106.00	Electronic Checkbook	14.97				
Code Breaker	14.35	Fast Tracks	20.97				
Desktop Plan 2	162.50	Fastload (Cart)	24.00.				
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(507)931-5879, **Xanadu BBS** -- St. Peter, MN. 300 baud, online 24 hrs. SysOp: Unknown. Love Connection, Used Equiptment, Messages, News.
(512)441-6611, **STarbase** -- Atari. unknown baud, online 24 hrs. SysOp: Unknown.
(512)477-4747, **Dial-Your-Match -38** -- Austin, TX. unknown baud, online ?? hrs. SysOp: Unknown.
(512)477-7593, **Dial-Your-Match -189** -- Austin, TX. unknown baud, online ?? hrs. SysOp: Unknown.
(512)592-1214, The Trade-80 BBS -- Kingsville, TX. unknown baud, online 24 hrs. SysOp: Bruce Claunch.
(512)694-0240, **Trunkworks Enterprises** -- San Antonio, TX. 3/12/24 baud, online 24 hrs. SysOp: David Savage. IBM & Sanyo SIGs. Open to the public. 8/N/1.
(513)293-8088, **DOUG** -- Dayton, OH. 300/1200 baud, online 24 hrs. SysOp: Michael Hoegler. FOG A.M.O. #79 member supported system. MS-DOS & CP/M users.
(513)335-2092, **Maverick Distributors** -- Troy, OH. unknown baud, online 6p7aM-F/24SaSu. SysOp: BMW & Associates B. Atari.
(513)372-3373, **Xenet Telecom BBS** -- Xenia, OH. 300/1200 baud, online 24 hrs. SysOp: Raymond Moore.
(513)481-1417, **COG RCP/M** -- Cincinnati, OH. 3/12/24 baud, online 24 hrs. SysOp: Unknown. Cincinnati Osborne Group (FOG A.M.O. #75) member supported system.
(513)787-3777, **The Imagination BBS** -- Camden, OH. 3/12/24 baud, online 24 hrs. SysOp: James Redd.
(514)487-2792, **Micro-Dial** -- Montreal, Canada. 300/1200 baud, online 24 hrs. SysOp: Leonard Fagen.
(514)684-4922, **Ozzie's FIDO (FOG -47)** -- Roxboro, Quebec. 300/1200 baud, online 24 hrs. SysOp: Rene Champagne. **PRACSA member**
(515)673-3763, **The Skunk River Bullit** -- Oskaloosa, IA. unknown baud, online 24 hrs. SysOp: Unknown.
(516)289-0367, **Tele-Master: HQ** -- Patchogue, NY. 3/12/24 baud, online 24 hrs. SysOp: Trace Microsystems.
(516)293-0499, **Dial-Your-Match -97** -- Farmingdale, NY. unknown baud, online ?? hrs. SysOp: Unknown.
(516)293-8251, **Dial-Your-Match -262** -- South Farmingdale, NY. unknown baud, online ?? hrs. SysOp: Unknown.
(516)294-9724, **SCROLL BBS** -- Malverne, NY. unknown baud, online ?? hrs. SysOp: Frank Fallon. Word processor users.
(516)349-7835, **Wise Byte BBS** -- Plainview, NY. 300/1200 baud, online 24 hrs. SysOp: Ron Clibnik. Atari.
(516)486-4705, **The Unknown RBBS** -- South Hempstead, NY. 3/12/24 baud, online 24 hrs. SysOp: David Johnson. AT&T PC6300 help, all compatibles welcome.
(516)754-8120, **Other Side of Spectrum** -- Ft. Salonga, NY. 300/1200 baud, online 24 hrs. SysOp: Joseph Moon. C-64, games, up/down loads.
(517)371-1106, **C.H.A.O.S. BBS** -- Lansing, MI. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari.
(517)372-3131, **The Club** -- Lansing, MI. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari ST, TRS.
(518)639-4490, **The HOST BBS** -- Fort Ann, NY. unknown baud, online 9a10pSa11a6pSu. SysOp: Ross Calloway.
(518)853-3195, **It's Another World** -- Fonda, NY. 300 baud, online 9pm-7am daily. SysOp: Rob Breuer.
(601)388-3673, **Payton's Place BBS** -- Biloxi, MS. unknown baud, online 24 hrs. SysOp: David Payton. Commodore.
(601)799-2494, **Gulf Coarst Commodore** -- Picayune, MS. 300/1200 baud, online 24 hrs. SysOp: Dennis McCord.
(603)487-2501, **Epson World Magazine** -- New Boston, NH. 3/12/24 baud, online 24 hrs. SysOp: Jim Hansen. Subscriptions, letters to the editor, etc. for Epson Users.
(606)781-4478, **Ruppel-Set][** -- Southgate, KY. 3/12/24 baud, online 24 hrs. SysOp: Ron Otto. MSDOS.
(607)539-6188, **Reptilia** -- Brooktondale, NY. 300/1200 baud, online 8pm - 8am EST. SysOp: Unknown.
(608)255-2755, **Bits II** -- Madison, WI. 3/12/24 baud, online 24 hrs. SysOp: Brian Goldsworthy. Primarily Apple.
(608)783-5755, **Microtech Dataline BBS** -- Onalaska, WI. unknown baud, online 24 hrs. SysOp: Elaine Mann. IBM and compatibles.
(609)227-8696, **KMMM Pascal BBS** -- Bellmawr, NJ. 300/1200 baud, online 24 hrs. SysOp: Willi Kusche. 8/N/1.
(609)298-3096, **DTJ4 Tarkus** -- Bordentown, NJ. 300/1200 baud, online 24 hrs. SysOp: Unknown.
(609)386-6509, **DTJ5 Police Academy** -- Burlington, NJ. 300/1200 baud, online 24 hrs. SysOp: Unknown.
(609)582-9418, **DTJ7 Police Hdqtrs** -- Pitman, NJ. 300 baud, online 24 hrs. SysOp: Unknown.
(609)723-7414, DTJ2Gopher County Line -- McGuire AFB, NJ. 300/1200 baud, online 24 hrs. SysOp: Unknown.
(609)728-0944, **DTJ1 Second Home BBS** -- Williamstown, NJ. 300/1200 baud, online 24 hrs. SysOp: Andrew Bernhardt. C64.
(609)728-6375, **DTJ8 Ground Zero** -- Williamstown, NJ. 300/1200 baud, online 24 hrs. SysOp: Unknown.
(609)758-3529, **DTJ9 Command 5** -- Wrightstown, NJ. 300 baud, online 24 hrs. SysOp: Unknown.
(609)768-8174, **DTJ3 Paranoia Central** -- Atco, NJ. 300/1200 baud, online 24 hrs. SysOp: Unknown.
(612)920-5566, **L5 MN Space BBS** -- Edina, MN. 3/12/24 baud, online 24 hrs. SysOp: Scott Shjefte.
(613)255-5836, **Diplomacy On-line** -- Ottawa, Ontario. unknown baud, online ?? hrs. SysOp: Unknown.
(614)268-0405, **Acec** -- Gahanna, OH. unknown baud, online ?? hrs. SysOp: Frank Seipel. Atari.
(614)274-6502, **C.O.C.U.G.** -- Columbus, OH. 300/1200 baud, online 24 hrs. SysOp: Unknown. Commodore.
(614)276-8050, **Teleport 64 BBS** -- Commodore. 300/1200 baud, online 24 hrs. SysOp: Unknown.
(614)447-1233, **XBBS** -- Columbus, OH. 300/1200 baud, online 24 hrs. SysOp: Unknown. MS-DOS.
(614)471-9209, **Pandora** -- Gahanna, OH. unknown baud, online ?? hrs. SysOp: Frank Seipel. Atari.
(614)481-7840, **PC Share BBS** -- Columbus, OH. 300/1200 baud, online 24 hrs. SysOp: Unknown. MS-DOS.
(614)855-1024, **Tele3co BBS** -- Columbus, OH. 300/1200 baud, online 24 hrs. SysOp: Unknown. Amiga.
(614)863-6721, **Pentagon** -- Columbus, OH. 3/12/24 baud, online 24 hrs. SysOp: Unknown.
(614)899-0439, **H.T.C. BBS** -- Columbus, OH. 300/1200 baud, online 24 hrs. SysOp: Unknown. Commodore.
(615)292-0710, **FOG -23** -- Nashville, TN. 300/1200 baud, online 24 hrs. SysOp: Ernie Dryden. $$$$ Fee system unless member of MidTOG or NAOUG. **PRACSA member**
(615)358-9307, **Atari Castle** -- Clarksville, TN. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari only.
(615)387-2467, **Fort Apocalypse** -- Clarksville, TN. unknown baud, online 24 hrs. SysOp: Unknown.
(615)431-6857, **Ali's RCPM/MBBS** -- Fort Campell, KY. 300/1200 baud, online 24 hrs. SysOp: Unknown.
(615)478-3782, **Fantasy World** -- Cleveland, TN. unknown baud, online 24 hrs. SysOp: Unknown.
(615)645-5299, **Okie Bug** -- Clarksville, Tn. 300 baud, online 7pm-11am (CST). SysOp: Ira Grims.
(615)852-4417, **The Skyline BBS** -- Five Points, TN. 300 baud, online 9pm-6am. SysOp: Kevin Cox.
(616)335-5119, **Multi-Board** -- Holland, MI. unknown baud, online 24 hrs. SysOp: Richard Brockmeier. TRS, IBM, Amiga, Apple.
(616)941-0463, **Ski's Lodge/North** -- Traverse City, MI. 300 baud, online 24 hrs. SysOp: Timothy L. Watson. Apple][e & GBBS.
(617)288-4667, **Bar-Ken (FOG 29)** -- Boston, MA. 300/1200 baud, online 24 hrs. SysOp: John Kinsella. Boston Osborne Group (FOG AMO #122) member supported system. **PRACSA member**
(617)361-5459, **Dial-Your-Match -284** -- Boston, MA. unknown baud, online ?? hrs. SysOp: Unknown.
(617)479-3432, **The*Unicorn's Inn TBBS** -- Wollaston, MA. 300/1200 baud, online ?? hrs. SysOp: Robert F. Connolly.
(617)792-6234, **Dial-Your-Match -85** -- Worchester, MA. unknown baud, online ?? hrs. SysOp: Unknown.
(617)797-5788, **Cobra's Pit BBS (tm)** -- Worcester, MA. 300/1200 baud, online 24 hrs. SysOp: Joe Robbs. Commodore users & others.
(617)875-3618, **Xevious** -- Framingham, MA. 300 baud, online 24 hrs. SysOp: Nels Anderson. Also (617)-449-7322, direct user chat.
(617)975-4485, **The Bible Study** -- Lawrence, MA. 300/1200 baud, online 24 hrs. SysOp: Maurice Bergerson.
(618)745-6163, **Computer Cellar BBS** -- Mounds, IL. unknown baud, online 24 hrs. SysOp: Greg Krempasky. Educational.
(618)847-2291, **Nationserv** -- Fairfield, IL. 3/12/24 baud, online 24 hrs. SysOp: Ben H. Nation. IBM, Commodore, Tandy, any others.
(619)272-1503, Dial-Your-Match -153 -- San Diego, CA. unknown baud, online ?? hrs. SysOp: Unknown.
(619)326-4928, **Teen BBS** -- Needles, CA. 300 baud, online Saturdays. SysOp: Chuck Swan.
(619)428-0318, **Dial-Your-Match -320** -- Imperial Beach, CA. unknown baud, online ?? hrs. SysOp: Unknown.
(619)695-2533, **Dial-Your-Match -183** -- San Diego, CA. unknown baud,

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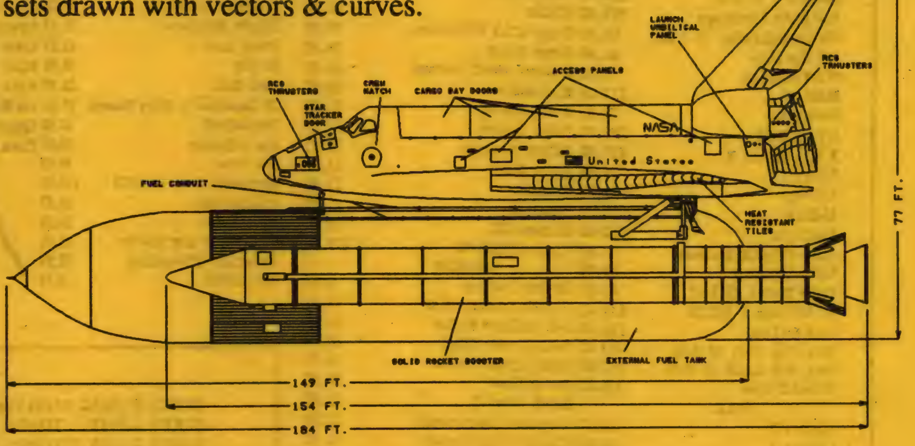

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online 24 hrs. SysOp: Unknown.

(812)429-0017, **Evansville KUG** -- Evansville, IN. unknown baud, online ?? hrs. SysOp: Unknown.

(813)345-0937, **Dial-Your-Match -408** -- St. Petersburg, FL. unknown baud, online ?? hrs. SysOp: Ludolph&Karl L.

(813)372-9211, **The Floppy Zone ST** -- New Port Richey, FL. 300/1200 baud, online 24 hrs. SysOp: David Pflanzer. XL/XE, ST and IBM.

(813)455-8449, **Dial-Your-Match -276** -- Naples, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(813)684-0354, **Saturn's Rings BBS** -- Tampa, FL. unknown baud, online 10:30pm-7:30pm. SysOp: John Bullard.

(813)786-5460, **'C'-Lion BBS** -- Clearwater, FL. 300/1200 baud, online 24 hrs. SysOp: George Lysy.

(813)837-2702, **Dial-Your-Match -354** -- Tampa, FL. unknown baud, online ?? hrs. SysOp: Unknown.

(813)856-5071, **The Inner Sanctum** -- Hudson, FL. 3/12/24 baud, online 24 hrs. SysOp: Rob&Carol Marlowe.

(813)862-8806, **Studio-64** -- Hudson, FL. 300/1200 baud, online 24 hrs. SysOp: Ralph LoBianco. A Commodore BBS & Online Store.

(813)962-1044, **The Wall BBS** -- Tampa, FL. 300/1200 baud, online ?? hrs. SysOp: Blair Hall. TRS-80 Model 4.

(814)339-6042, **NAAUG** -- Lemont, PA. unknown baud, online 24 hrs. SysOp: Richard Shoemaker. North American Amiga Users Group members.

(815)436-3396, **Dial-Your-Match -269** -- Plainfield, IL. unknown baud, online ?? hrs. SysOp: Unknown.

(815)842-4636, **The Swamp** -- Morris, IL. 300/1200 baud, online 24 hrs. SysOp: Ruth West.

(815)874-8534, **Spectre III** -- New Milford, IL. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(816)331-5868, **Howard's BBS** -- Raymore, MO. 300/1200 baud, online 24 hrs. SysOp: Jim Howard. Tandy 2000.

(816)765-9306, **Barsoom BBS** -- Kansas City, MO. 3/12/24 baud, online 24 hrs. SysOp: John Carter. Atari only.

(816)826-8209, **The Commodore Flagship** -- Sedalia, MO. unknown baud, online ?? hrs. SysOp: Unknown.

(816)827-3027, **Commodore Exchange Net** -- Sedalia, MO. unknown baud, online 24 hrs. SysOp: Eric Bartlett.

(817)569-2080, **The Compu-System** -- Wichita Falls, TX. 300 baud, online 24 hrs. SysOp: Unknown. Commodore C/64.

(817)766-3274, **The Lab** -- Wichita Falls, TX. 300 baud, online 24 hrs. SysOp: Unknown. Commodore C/64.

(817)855-9429, **The Zoot Suit** -- Wichita Falls, TX. 300/1200 baud, online 24 hrs. SysOp: Unknown.

(817)865-6352, **The Gate** -- Gatesville, TX. 300/1200 baud, online 24 hrs. SysOp: Bennett Hamilton. Atari.

(818)248-0562, **The Dugout BBS** -- La Crescenta, CA. unknown baud, online ?? hrs. SysOp: Jim Edwards.

(818)338-3625, **The Dark Side II** -- Whittier, CA. 300 baud, online 25 hrs. SysOp: Brendon Wasthave.

(818)445-4859, **Dial-Your-Match -420** -- Arcadia, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(818)446-5813, Arm BBS -- Arcadia, CA. unknown baud, online 24 hrs. SysOp: Bob&Kim Reynolds. Atari and All.

(818)766-6442, **The Hotline DataBoard** -- North Hollywood, CA. 3/12/24 baud, online 24 hrs. SysOp: Jon Badeaux. U.S. & European music, TV ratings, CD sales, online info re home video market, Video Take-Out.

(818)783-4745, **Dial-Your-Match -386** -- Sherman Oaks, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(818)785-3498, **Dial-Your-Match -210** -- Van Nuys, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(818)787-0156, **RBBS (Bondwell SIG)** -- Van Nuys, CA. 300/1200 baud, online 24 hrs. SysOp: Jon Bek. CP/M & MS-DOS.

(818)840-8066, **Fantasy Plaza** -- Burbank, CA. unknown baud, online ?? hrs. SysOp: Gregg Collins.

(818)842-3322, **Party & News Line** -- Burbank, CA. unknown baud, online ?? hrs. SysOp: Gregg Collins.

(818)842-6900, **Dial-Your-Match -1** -- Burbank, CA. unknown baud, online ?? hrs. SysOp: Gregg Collins.

(818)845-5325, **Dial-Your-Match -300** -- Burbank, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(818)882-5571, **Dial-Your-Match -240** -- Canoga Park, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(818)882-6045, **TUG-Net** -- Chatsworth, CA. 300/1200 baud, online 24 hrs. SysOp: Bob Koller. FOG Remote System #16 -- Technical User Group Network (FOG AMO #106) member supported system. **PRACSA member**

(818)888-6600, **Dial-Your-Match -28** -- Winetka, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(818)888-6688, **Dial-Your-Match -411** -- Canoga Park, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(818)954-0790, **Dial-Your-Match -203** -- Burbank, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(818)954-0800, **The Underground RBBS** -- Burbank, CA. 3/12/24 baud, online 24 hrs. SysOp: Larry Shadle. Multi-interest, supporting IBM-PC and Compatibles.

(818)982-7882, **Dial-Your-Match -219** -- North Hollywood, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(818)997-7575, **Dial-Your-Match -65** -- Van Nuys, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(901)357-5425, **TIBBS of Memphis** -- Memphis, TN. 300/1200 baud, online 24 hrs. SysOp: Pierre Lamontagne.

(904)265-4902, **Montego Bay** -- Panama City, FL. 300 baud, online 24 hrs. SysOp: Zack Taylor. Supports ASCII & ATASCII, online Adventures, music charts, user novel, current events, animations.

(904)268-9480, **The Bus Depot** -- Jacksonville, FL. 300/1200 baud, online ?? hrs. SysOp: Felix M. Pendais.

(904)375-0059, **Esoteric Oracle** -- Gainesville, FL. 3/12/24 baud, online 24 hrs. SysOp: Jason Cook.

(904)596-6759, **Public Toilet BBS** -- Brooksville, FL. unknown baud, online 8pm - 6am. SysOp: Jerrold Walker.

(904)686-0094, **The Dreamland Express** -- Spring Hill, FL. unknown baud, online 24 hrs. SysOp: Charles Oppermann. Color Computer.

(904)686-1549, **Igor's Lab BBS** -- Springhill, FL. unknown baud, online 9pm - 8am. SysOp: Ian Berkman.

(904)788-4181, **Atari Trader** -- Daytona Beach, FL. 1200 baud, online 24 hrs. SysOp: James Delk.

(907)349-2459, **TW3 BBS & RCP/M'** -- Anchorage, AK. 3/12/24 baud, online 24 hrs. SysOp: Truman S. Walrod. GUIDE (FOG A.M.O. #63) member supported system.

(912)883-7297, **U.S.S. Saratoga** -- Albany, GA. unknown baud, online 24 hrs. SysOp: Maurice Tift.

(914)562-7837, **The AlterLink BBS** -- New Windsor, NY. 3/12/24 baud, online 24 hrs. SysOp: Rich Roos. IBM PC-XT,PC-Board.

(914)564-3641, **All Night Connection** -- ,. 300/1200 baud, online 9pm - 6pm. SysOp: Steve & Terri. All computers.

(914)564-7228, **All Night Connection** -- New Windsor, NY. 300/1200 baud, online 9pm - 7pm. SysOp: Michael A. Koby. All computers, contests with FREE prizes.

(914)679-8734, **Woodstock RCP/M** -- Woodstock, NY. 3/12/24 baud, online 24 hrs. SysOp: J. R. Doak. CP/M and MS-DOS.

(915)821-0006, Dial-Your-Match -152 -- El Paso, TX. unknown baud, online ?? hrs. SysOp: Unknown.

(915)855-1333, **Joe's Board** -- El Paso, TX. 300/1200 baud, online 24 hrs. SysOp: Joe Grossinger. Commodore.

(915)855-1503, **Hackers Hospice** -- El Paso, TX. 300/1200 baud, online 24 hrs. SysOp: Joe Grossinger.

(916)222-2322, **Amazon BBS** -- Redding, CA. unknown baud, online 6pm-6am (PDT). SysOp: Julie Sullivan. Commodore.

(916)334-9059, **Humanx Commonwealth** -- Sacramento, CA. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari.

(916)361-0559, **Bill Board** -- Sacramento, CA. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari.

(916)392-7279, **Select** -- Sacramento, CA. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari.

(916)423-1316, **Great Escape** -- Sacramento, CA. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari.

(916)423-3987, **City of Grey** -- Sacramento, CA. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari.

(916)448-3837, **Access** -- Sacramento, CA. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari.

(916)736-0739, **Dial-Your-Match -197** -- Sacramento, CA. unknown baud, online ?? hrs. SysOp: Unknown.

(916)927-3012, **Sac TIBBS** -- Sacramento, CA. 300/1200 baud, online 24 hrs. SysOp: E. W. Large.

(916)965-3416, **Shadow Haven** -- Sacramento, CA. 300/1200 baud, online 24 hrs. SysOp: Unknown. Atari.

(919)447-7601, **The Wizzards Den** -- Cherry Point, NC. 300/1200 baud, online ?? hrs. SysOp: J. Bradley. Punter UL/DL.

(919)556-7975, **The Third Wave** -- Raleigh, NC. 3/12/24 baud, online ?? hrs. SysOp: Ken Zipin. IBM/Apple/Commodore/Multi-User.

(919)779-6674, **Micro Message Service** -- Raleigh, NC. 3/12/24 baud, online ?? hrs. SysOp: Michael Stroud.

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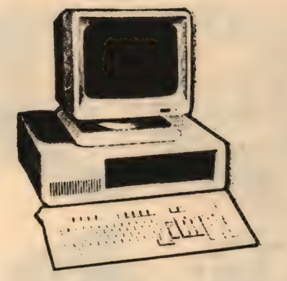

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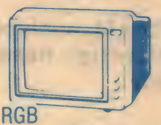

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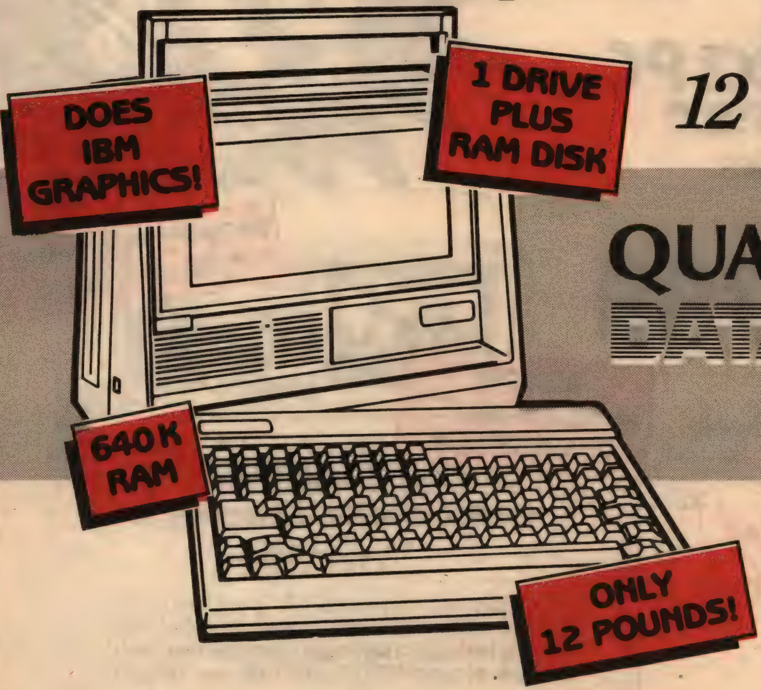
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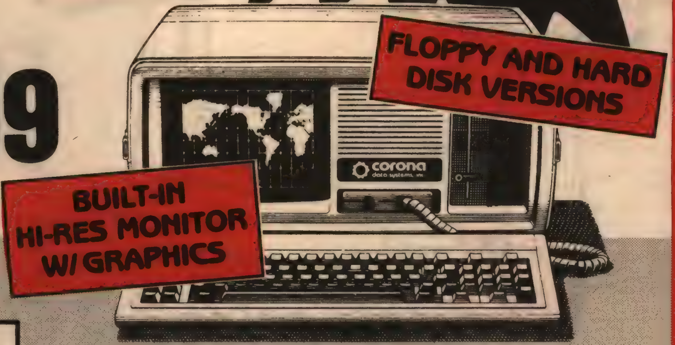

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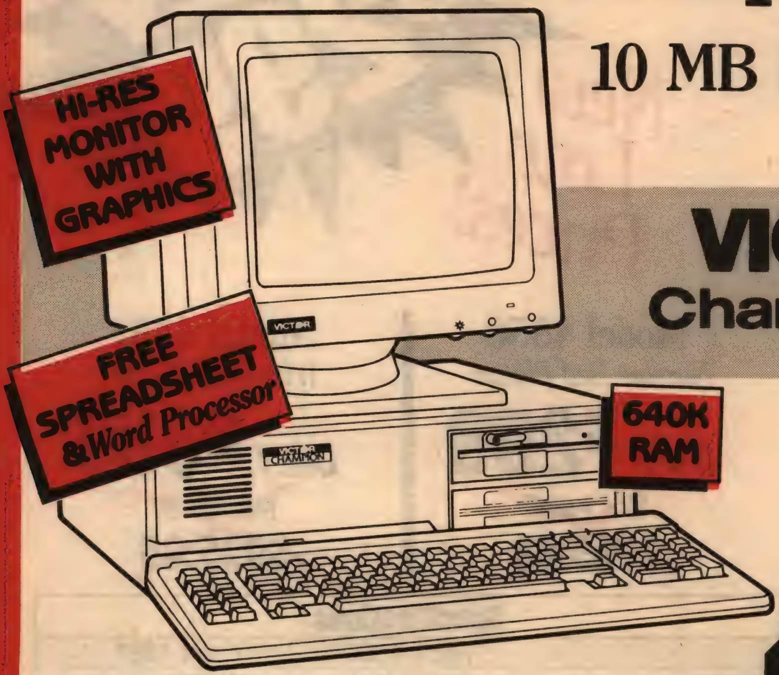

HI-RES MONITOR WITH GRAPHICS

FREE SPREADSHEET & Word Processor

640K RAM

VICTOR® Champion PC

Why risk your money on a no-name clone when you can get a quality brand name, warranted computer, with 10 MB hard drive, monitor, and free software for about the same price!

- 640K RAM
- 360K Floppy Drive
- 10 MB Hard Disk Drive
- Monochrome Graphics Adapter
- Hi-Res Monochrome Monitor w/Graphics Capabilities
- 5 Full Length Expansion Slots
- AT-Style Detached Keyboard
- Parallel and Serial Ports
- MS-DOS, VBASICA (Enhanced GW Basic)
- CalcResult Spreadsheet and WordResult Word Processor by Handic
- 1 Year Warranty
- Manufacturer's Toll Free Support Line

PC MAGAZINE

EDITOR'S CHOICE

In its October 14, 1986 issue, PC Magazine awarded its "Editor's Choice" award to the Victor VPC II.

The VPC II came with 640K RAM, one floppy disk drive and a floppy disk drive controller, and sold for $1095. We are now selling the Victor Champion PC, which has the same motherboard, for the same low price, but the Champion now also features a 10 megabyte hard drive, a high resolution monochrome monitor, a monochrome graphics card, and advanced technology all around.

Victor Technologies has been one of the leading manufacturers of computer and office equipment for over 60 years, so you can be sure that their 1 year warranty is definitely an advantage. And, of course, you also get our 15 day 100% satisfaction guarantee.

100% Satisfaction Guarantee

1 year warranty from Victor plus 15 day trial. If you are not satisfied with this computer for any reason, simply call to return it within 15 days of receipt for a complete refund.

SPECIAL OFFER!

Get $20 off any software package or any printer with the purchase of the Victor Champion PC!

($20 off 1 item only.)

Ordering Information

Please specify **Product #VC640-C1 when ordering. Add $39 shipping and handling per computer.**

Order Toll Free

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Product Information
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Plotter Liquidation!

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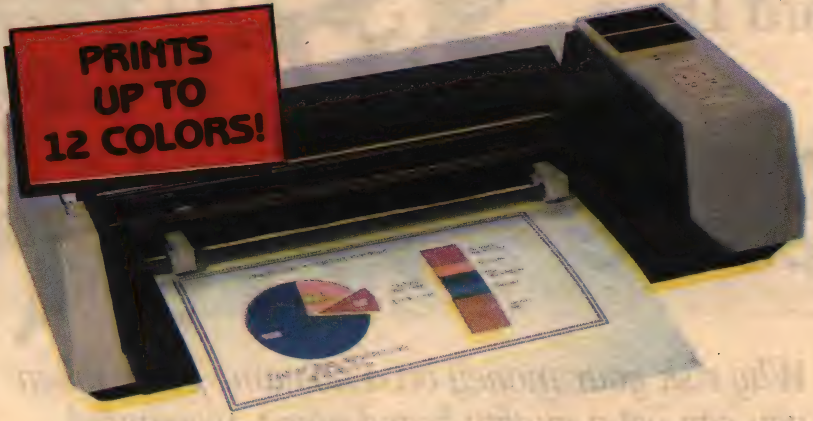


ONLY $299

New Low Prices!

Model 4550	Model 4551
Narrow Bed Plotter	*Wide Bed Plotter*
ONLY $299	ONLY $599
~~Mfr. Retail $795.00~~	~~Mfr. Retail $995.00~~

FACIT 4550/4551 Plotters

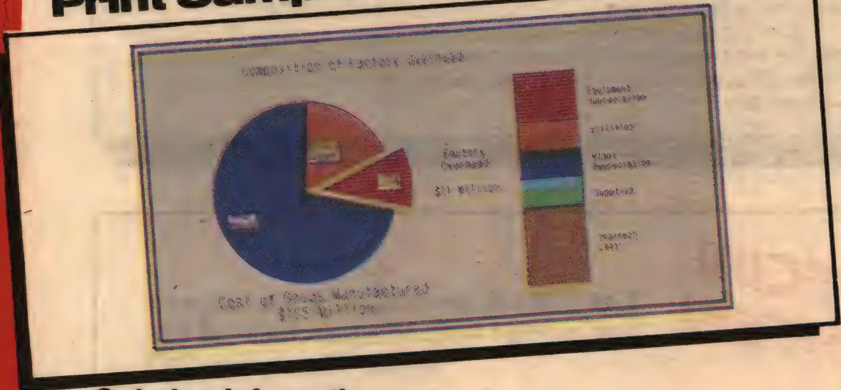
Wide Bed and Narrow Bed Models Available

- Hewlett Packard Graphic Language (HP-GL) Emulation
- Use for Business Graphics or CAD/CAE Drawings
- Roller Bed Technology
- Prints In 12 Colors (6 Pens Per Cassette)
- Small Footprint
- Prints on Paper or Overhead Film
- 3D Capability
- 6 Pen Cassette
- Parallel and Serial Interfaces Standard

Specifications

	Facit 4550	Facit 4551
Media Sizes	A4 (ANSI A) 8″ x 11″	A3 (ANSI B) 11″ x 17″
Plotting System	Moving Paper/Moving Penhead	
Pen Types	Ballpoint, 0.4mm	
Number of Pens	6 per Cassette	
Colors	8 to 12	
Pen Velocity	Paper: 150mm/sec	Paper: 200mm/sec
	Overhead Film: 60 or 100 mm/sec	
Resolution	0.1 mm	
Repeatability	0.2 mm	
Accuracy	±0.3% ±0.2 mm	
Graphic Commands	HP Graphic Language	
Alpha Commands	HP Graphic Language in 16 National Versions	
Character Speed	Alphanumeric Characters: approx. 4.5 CPS Character Resolution 32 x 32	
Input Buffer	2K	
Interfaces	Parallel (Centronics) and Serial (RS-232)	
Protocols	READY-BUSY, XON-XOFF, ETX (ENQ)-ACK	
Power	100/115 V or 220/240 V	
Dimensions L x W x H	440 x 285 x 132 mm 17 x 11 x 5 inches	525 x 285 x 132 mm 20.5 x 11 x 5 inches
Weight	6.0 kg 13.3 lb	6.85 kg 15.2 lb

Print Sample



100% Satisfaction Guarantee

90 day manufacturer's warranty plus 15 day trial. If you are not satisfied with this plotter for any reason, simply call to return it within 15 days of receipt for a complete refund.

Ordering Information

Product #	Item	Price	Shipping
FA550-C1	Facit 4550 Narrow Bed Plotter	$299	$15
FA551-C1	Facit 4551 Wide Bed Plotter	$599	$17

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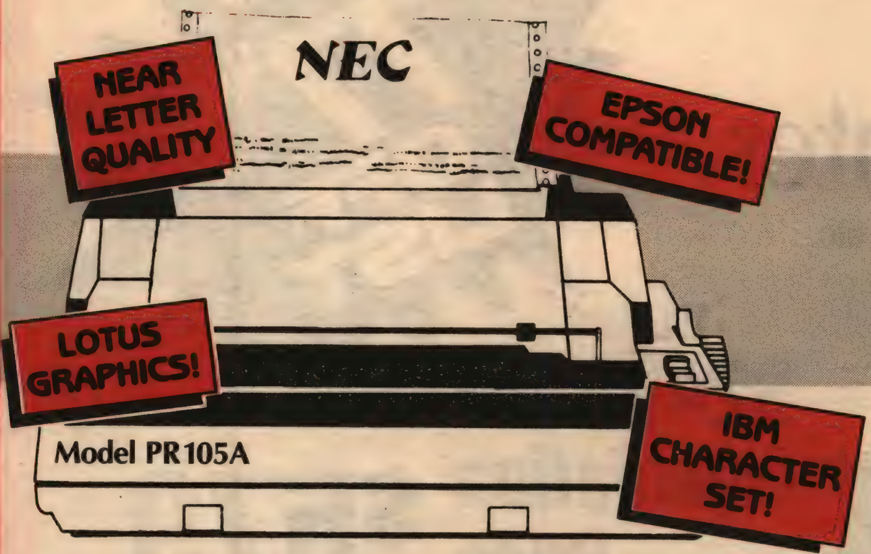
Incredible Value! BCE

NEC NLQ Printer!



ONLY $149

Mfr. Retail ~~$399.00~~

- Epson FX-80 Compatible
- IBM Text and Graphics Character Sets
- 110 CPS Draft, 46 CPS NLQ
- Tractorfeed Included
- True Lower Case Descenders

Print Samples

```
     How did NEC make a  printer
this good?  You're looking at the
unretouched correspondence-quality
printout of NEC's new PC-PR105A
IBM* Compatible dot matrix printer.
Note the smooth letter forms and
the true descenders on the lower-
case q, y, p, g, and j.

     How did NEC make a  printer
this fast?  This draft-quality type
was printed out at a speedy 110
characters per second.

     How did NEC make a  printer
this flexible?  Take a look at this
NEC's graphic talents.  The PC-
```

Specifications

Printing Method:	Impact Dot Matrix
Print Head:	Impact Line Dot Type, 16 pin
Character Sets:	ASCII and Italic ASCII characters; International and Italic International Characters; IBM Graphics Printer Graphics; IBM Matrix Printer Block Graphics
Control Code Sets:	NEC Standard; IBM Graphics Printer; Epson FX-80
Characters Per Inch:	High Speed Pica 10 CPI, enlarged 5 CPI; High Density Pica 10 CPI, enlarged 5 CPI; Elite 12 CPI, enlarged 6 CPI; Condensed 17.1 CPI, enlarged 8.57 CPI
Characters Per Line:	High Speed Pica 80 CPL, enlarged 40 CPL; High Density Pica 80 CPL, enlarged 40 CPL; Elite 96 CPL, enlarged 48 CPL; Condensed 137 CPL, enlarged 68 CPL
Printing Speed:	High Speed Pica 92 CPS, 69 LPM; High Density Pica 46 CPS, 34.5 LPM; Elite 110 CPS, 68.8 LPM; Condensed 78 CPS, 34.2 LPM
Character Composition: (V x H)	High Speed Pica 7 x 9 dots; High Density Pica 13 x 9 dots; Elite 7 x 7 dots; Condensed 7 x 9 dots
Buffer Size:	4K Bit image type
Paper Feed:	Friction and Tractorfeed
Paper Type:	Cut Sheets or fanfold up to 10″ wide
Paper Thickness:	Up to 0.10mm
Number of Copies:	Original plus two copies
Ribbon:	Black cartridge ribbon with 1 million character life (high speed pica)
Interface:	Centronics, 8 bit parallel
Dimensions:	13¾″(W) x 5½″(H) x 10″(D)
Weight:	15.3 lbs.

Ordering Information

Product #	Item	Price	Shipping
NC105-C1	NEC PR105A Printer	$149	$15
CA200-C1	IBM Parallel Cable	$19	FREE SHIPPING WITH PRINTER ORDER
CA250-C1	Centronics to Centronics Parallel Cable	$19	

100% Satisfaction Guarantee

90 day warranty from NEC plus 15 day trial. If you are not satisfied with this printer for any reason, simply call to return it within 15 days of receipt for a complete refund.

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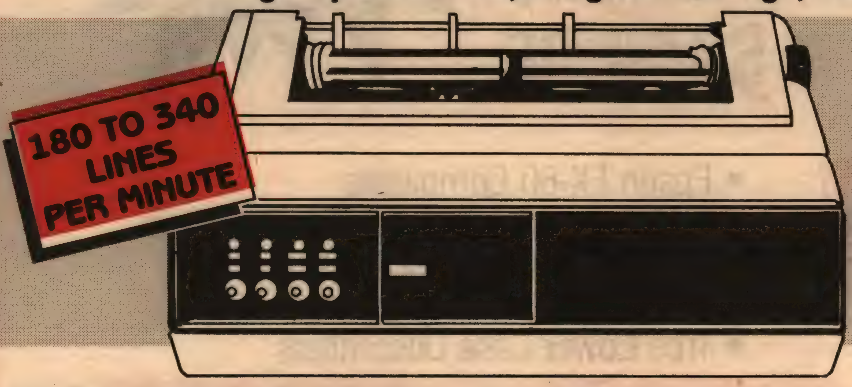
Liquidation!

400 CPS Heavy Duty Printer

For High Speed Drafts, Program Listings, etc.

77% OFF LIST



180 TO 340 LINES PER MINUTE

~~Mfr. Retail~~

~~$2495.00~~

Liquidation Price $579

New Low Price!

Diablo P38

- 400 CPS Bi-Directional Dot Matrix Printing
- High Reliability—No Maintenance Required. No Adjustments
- Long Life Ribbon
- Built-In Tractorfeed For Rear Or Bottom Paper Feed
- Parallel Interface

Specifications

Character Format: 7x7 matrix

Characters per second: 400± 5%

Lines per minute:

Characters per line	40	60	80	132
Lines per minute	340	260	220	140

Line Feed Speed: 55 msec, 8″ per second

Print Head: 14 pin design

Character Sets: Standard—96 Character ASCII; Selectable—7 National character sets selected via toggle switch.

Line Length: 132 characters

Buffer Capacity: 256 characters max.

Character Density: 10 CPI Standard

Form Length: 3½″ to 14″, selectable via rotary switch

Line Density: 6 LPI Standard

Ribbon Cartridge: Black, available in normal (2 million character life expectancy) and long life (8 million character life expectancy).

Paper: Fanfold paper, 3″ to 15″ fed from either rear or bottom of feed slots through width-adjustable tractors.

Copies: Original plus four copies (more if carbonless paper used). Multiple copy lever located inside printer case.

Power requirements: 120 VAC, 60 Hz, 170 Watts max, +10/-15%

Dimensions:

Size	22.0″(W) x 16.1″(D) x8.2″(H)
Weight	39.5 lbs. (18 kg)

Print Sample

```
89 `abcdefghijk :;<=>?@ABCDE
789 `abcdefghijk :;<=>?@ABCDE
6789 `abcdefghijk `:;<=>?@ABC
56789 `abcdefghijk :;<=>?@AB
456789 `abcdefghijk `:;<=>?@A
3456789 `abcdefghijk :;<=>?@
23456789 `abcdefghijk `:;<=>?
123456789 `abcdefghijk :;<=>
0123456789 `abcdefghijk `:;<=
/0123456789 `abcdefghijk :;<
 /0123456789 `abcdefghijk `:;
& /0123456789 `abcdefghijk `:
%& /0123456789 `abcdefghijk `
```

Ordering Information

Product #	Item	Price	Shipping
DP38-C1	Diablo P38	$579	$27
CA200-C1	IBM Parallel Cable	$19	FREE SHIPPING WITH PRINTER ORDER
CA250-C1	Centronics to Centronics Parallel Cable	$19	

100% Satisfaction Guarantee

Full 90 day manufacturer's warranty plus 15 day trial. If you are not satisfied with this printer for any reason, simply call within 15 days of receipt to return it for a complete refund.

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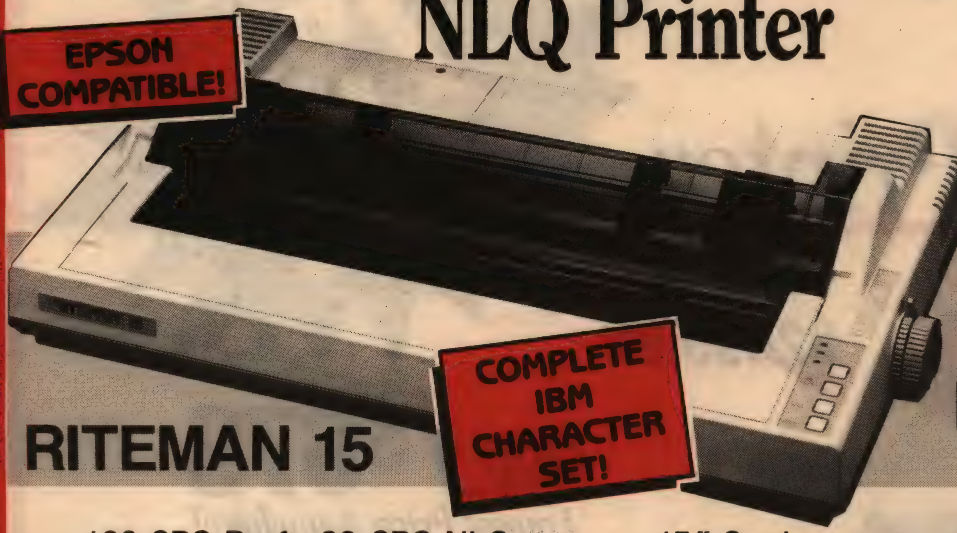
Liquidation!

C.ITOH® Wide Carriage NLQ Printer



57% OFF LIST

~~List Price $699.00~~

Liquidation Price $299

- 160 CPS Draft, 32 CPS NLQ
- 53 Lines Per Minute Throughout
- Switch Selectable NLQ Mode
- Switchable Push/Pull Tractorfeed
- 15" Carriage
- 8K Buffer
- Parallel Interface
- 1 Year Warranty

Print Samples

```
The  high  speed draft mode  of  the
C.Itoh Riteman 15, combined with its
15" carriage,  makes it perfect  for
spreadsheets  and  other  printouts.
The  Near  Letter  Quality  mode  is
ideal  for  all  types  of  business
correspondence.
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890-={};/!@#$%^&*()
```

```
ABCDEFGHIJKLMN
abcdefghijklmn
1234567890-={}
```

FREE SOFTWARE!

SMART KEY
plus
SmartPrint

With the purchase of the C.Itoh Riteman 15 printer, we'll give you the SmartKey/SmartPrint software package **absolutely free!** See our full page ad for complete details on SmartKey.

(For IBM PC and compatible systems.)

Specifications

Print Speed: 160 CPS Draft, 32 CPS NLQ. Logic seeking, bi-directional
Print Head: 9 wire dot matrix
Paper Feed: Tractorfeed and friction feed standard
Character Set: Full 96 character ASCII and italic, true lower case descenders. 32 block graphics, all IBM graphics, 8 international characters. Emulates IBM and Epson printer codes.
Print Size/Mode: Standard Pica: 10 CPI, 136 characters per line; Standard Elite: 12 CPI, 163 characters per line; Compressed: 17 CPI, 233 characters per line; Expanded: 5 CPI, 68 characters per line. Also supports double strike, italics, emphasized, superscripts and subscripts.
Graphics Bit Image: Horizontal density of 816, double density of 1632 dots per line. 1:1 mode, 979 dots per line. Column scan bit image, 8 × N.
Line Spacing: 1/16", 1/8", 7/72", programmable n/72", and n/216"
Form Length: Standard 66 line
Buffer Size: 8K standard
Power Supply: AC 115 Volt 50/60 Hz, stepper motor
Ribbon: Compact cassette, 2 million character life
Size: 4¾"(H) x 13"(D) x 23¼"(W)
Weight: 21 lbs.

100% Satisfaction Guarantee

1 year warranty from C.Itoh plus 15 day trial. If you are not satisfied with this printer for any reason, simply call to return it within 15 days of receipt for a complete refund.

Ordering Information

Product #	Item	Price	Shipping
CT15-C1	C.Itoh Riteman 15 Printer	$299	$22
CA200-C1	IBM Parallel Cable	$19	FREE SHIPPING WITH PRINTER ORDER
CA250-C1	Centronics to Centronics Parallel Cable	$19	

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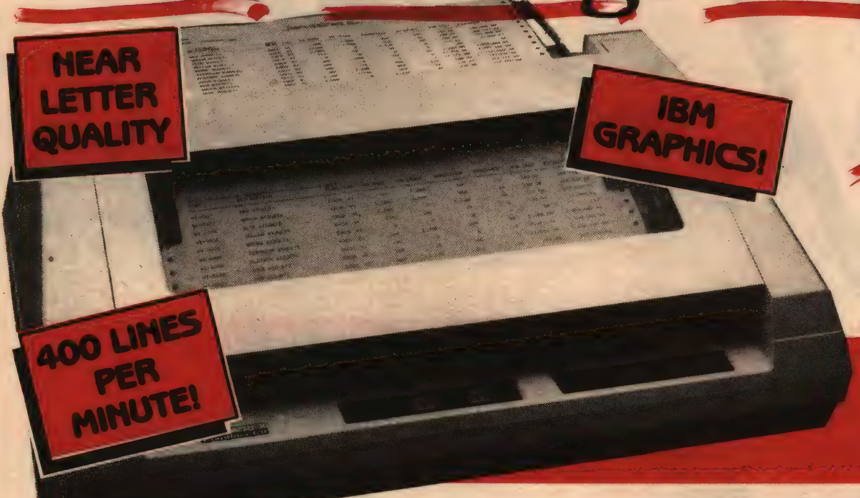
Liquidation! 420cps/NLQ Wide Carriage Printer



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ONLY $679

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EPSON COMREX CR420

Same as Epson 420i

Laser Speed at ⅓ the Price!

- 417 CPS Draft, 104 CPS NLQ
- Complete IBM Text and Graphics Character Sets
- 9 Type Styles Selectable from Front Panel
- Built-In Tractorfeed—Rear and Bottom Feed
- Parallel *and* Serial Interfaces
- 18K Buffer
- Built-In Acoustic Cover
- Heavy Duty Construction

Specifications

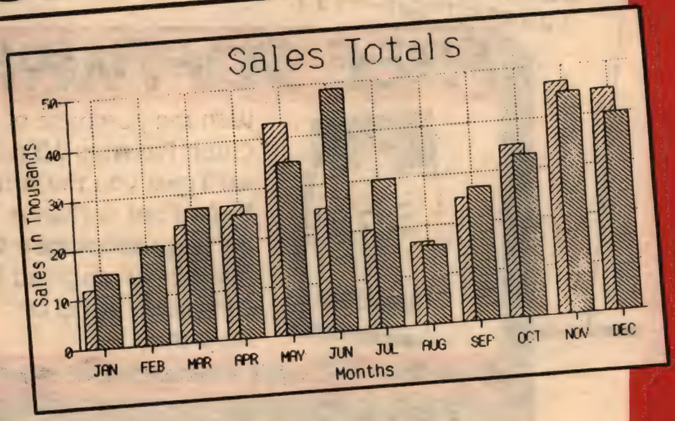
Print Method: Impact Dot Matrix **Print Direction:** Bidirectional Logic Seeking **Print Speed:** 417 cps Standard 10, 12, 16 Pitch, 208 cps Boldface & Super/Subscript, 104 cps Near Letter Quality **Number of pins:** 8 (Staggered Arrangement) **Character Set:** IBM PC Compatible, Low & High Order Character Set **Character Styles:** Draft—10, 12, 16, and 20 Pitch Near Letter Quality—10, 12, and Proportional Pitch **Character Attributes:** Boldface, Italicized, Expanded, Super/Subscripted, Underlined **Interfaces:** Parallel Centronics and Serial RS-232C **Baud Rate:** 1200, 2400, 4800, 9600 **18K Input Buffer:** Standard **Indicators:** Power On, Paper Out, On-line **Switches:** Power On/Off, On-Line, Top of Form Set, Form Feed, Line Feed Reset **Detectors:** Paper Out and Error Detection Alarm **Print Head Life Expectancy:** 200 Million Characters **MTBF (Excluding Print Head, Life):** 3200 Hours at 25% Duty Cycle & 30% Page Density **Ribbon Type:** Cartridge **Ribbon Life Expectancy:** 10 Million Characters, Draft, 78 Million Characters, Correspondence **Power Consumption:** 175 Average Watts (Printing), 55 Watts (Standby) **Paper Feed:** Friction and Pin Feed **Form Width:** 4⅞″–15½″ **Copies:** Original plus Four (maximum thickness 0.0118″, carbonless) **Paper Path:** Rear and Bottom **Dimensions:** 23.4″(W) x 7.6″(H) x 15.9″(D) **Weight:** 60 lb. **Front Panel Selection of:** Nine Fonts, Nine Forms Lengths **Acoustal Noise:** 60db(A) **Standard Accessories:** Cassette Style Ribbon, Single Color; Paper Rack, User's Guide

100% Satisfaction Guarantee

90 day factory warranty from EPSON plus 15 day trial. If you are not satisfied with this printer for any reason, simply call to return it within 15 days of receipt for a complete refund.

Print Samples

Correspondence
Elite
Proportional
Condensed
Expanded
Emphasized
Super and Subscript
Underline
Italics



Ordering Information

Product #	Item	Price	Shipping
C420-C1	Epson/Comrex 420 Printer	$679	$29
CA200-C1	IBM Parallel Cable	$19	FREE SHIPPING WITH PRINTER ORDER
CA250-C1	Centronics to Centronics Parallel Cable	$19	

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Letter Quality Printers!

14 CPS Daisywheel

76% OFF LIST

Transtar 120 $129

A Letter Quality Printer At A Dot Matrix Price!

- 14 CPS
- Portable
- Lightweight

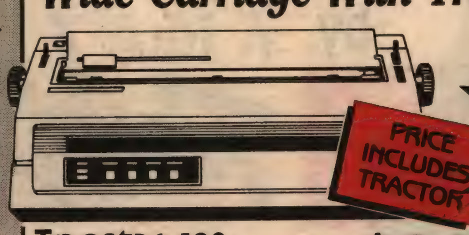
- Parallel and Serial Models Available
- Diablo Compatible—Works With Most Popular Word Processing Programs
- Automatic Paper Loading
- 6 Month Warranty

Specifications

Print Speed: 14 characters per second *(cps)* *(Shannon Text)*
Print Method: fully formed daisywheel characters
Character Set: ASCII 96-character, upper and lower case
Character Spacing: 10, 12, and 15 cpi, switch selectable
Horizontal Spacing: 1/20th-inch increments
Vertical Line Spacing: 1/48th-inch increments
Forms Width: 13 inches maximum
Line Feed Speed: 2 inches per second
Carriage Return Speed: 1200 ms per 10 inches
Ribbon: fabric or mylar *(single strike)* cartridge, Olivetti compatible
Printwheel: 96-character plastic daisywheel, 10, 12, and 15 cpi
Interface: Model 120P: Centronics-compatible 8-bit parallel; Model 120S: XON/XOFF or ETX/ACK protocol
Baud Rates: Model 120S: 300, 600, 1200, 2400, 4800, and 9600 bits per second *(switch selectable)*
Buffer Size: Model 120S: 1790 bytes
Parity: Model 120S: Even, Odd, None *(switch selectable)*
Code Compatibility: Plug and software compatible with Diablo 1610/1620 routines *(except two-color ribbon)* for full feature compatibility with leading word processing packages
Software Enhancements: Software selectable form length from 1 to 126 lines
Paper Thickness: Original plus 3 copies *(maximum)*
Automatic Paper Loading: Autoload function loads paper to one of four switch-selectable positions
Power Requirements: 120 VAC 60 Hz at 1.5 amps
Noise: 65 dB(A) or less
Dimensions: 17.5″(W) x 4.8″(H) x 12.4″(D)
Weight: 18.7 lbs.

19 CPS Daisywheel

Wide Carriage With Tractorfeed



PRICE INCLUDES TRACTOR

70% OFF LIST

Transtar 130 $249

With Tractorfeed And Sheetfeeder ONLY $329

- Parallel and Serial Models Available
- Diablo Compatible—Works With Most Popular Word Processing Programs
- Automatic Paper Loading
- 6 Month Warranty

- 19 CPS Bi-Directional Printing
- Proportional Spacing
- Automatically Loads Single Sheets to One of Four Selectable Positions

Specifications

Print Speed: 20 CPS (18 CPS Shannon text)
Print Method: Fully formed daisywheel characters
Character Set: ASCII 96 character, full upper and lower case
Character Spacing: 10, 12 and proportional, switch selectable
Form Width: 17″ maximum **Line Feed Speed:** 4″ per second
Ribbon: Cartridge type, fabric or mylar, Olivetti compatible
Printwheel: 96 character plastic daisywheel
Interfaces: Model 130P—Centronics parallel; Model 130S—RS232C (DTR, XON/XOFF, ETX/ACK)
Baud Rates: Model 130S—300, 600, 1200, 2400, 4800, 9600 (switch selectable)
Compatibility: Diablo 1610/1620
Paper Thickness: Original plus 4 copies
Auto Paper Loading: Autoload function automatically loads single sheet paper to one of four switch selectable positions: first printable line, 1″ down, 1½″ down, or 2″ down
Sensors: End of Ribbon, Cover Open, Ribbon Jam
Panel Indicators: Power, Alert, Print On
Control Panel Switches: Autoload, Line Feed, Page Eject, Pause/Continue
Power Requirements: 120 VAC 60 Hz at 1.5 amps
Dimensions: 23″(W) x 7.5″(H) x 14″(D)
Net Weight: 31 lbs.

Ordering Information

Product #	Item	Price	Shipping
TS120P-C1	Transtar 120 Parallel Printer	$129	$17
TS120S-C1	Transtar 120 Serial Printer	$129	$17
TS130P-C1	Transtar 130 Parallel Printer	$249	$22
TS130S-C1	Transtar 130 Serial Printer	$249	$22
TS999-C1	Sheetfeeder for Transtar 130	$80	$7
CA200-C1	IBM Parallel Cable	$19	FREE SHIPPING WITH PRINTER ORDER
CA250-C1	Centronics to Centronics Parallel Cable	$19	

100% Satisfaction Guarantee

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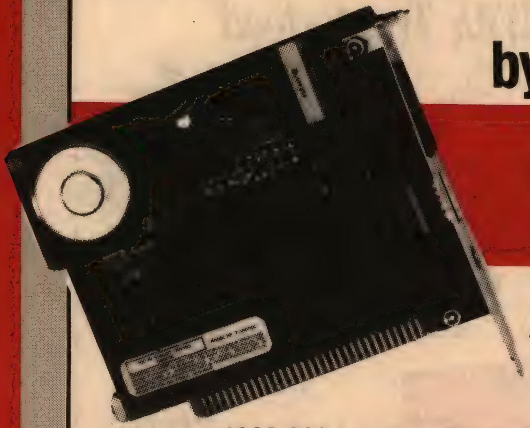
Brand Name Hayes Compatible Modems!

1200 Baud Internal Modem



by AMAZING *Things*

Comparable Price ~~$549.00~~

ONLY $99

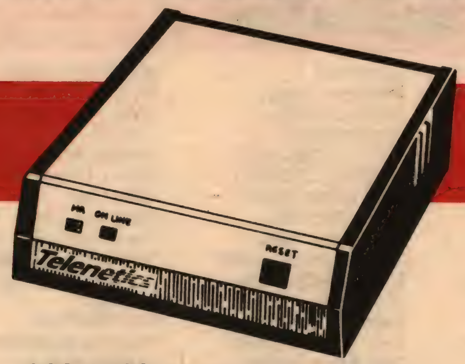
For IBM PC, XT, AT and Compatibles

Runs SmartCom, CrossTalk, PC-Talk and Many More!

2 Year Warranty!

- 1200-300 bps Data Transmission
- Half Card Internal Modem
- Compatible with IBM PC, XT, AT and Compatibles
- AutoDial/AutoAnswer
- Asynchronous Data Transmission
- Dual Telephone Jacks
- BitCom Communications Software Included
- Bell 212A/103A Compatible
- RJ11 Telephone Cord Included

2400 Baud External Modem



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By Telenetics

Works with IBM and Most Other Computers and Terminals

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Runs CrossTalk, PC Talk, Relay and Many More!

3 Year Warranty!

- 300-2400 bps Data Transmission
- AutoDial/AutoAnswer (under Software Control)
- Toll Free Diagnostics Line
- Asynchronous Data Transmission
- Full or Half Duplex
- RS232 Interface
- Power Cord Included
- Bell 212/103 Compatible
- Free 30 Day Subscription to Online Airline Guide

100% Satisfaction Guarantee

Both modems come with manufacturer's warranty plus our 15 day trial. If you are not satisfied with these modems for any reason, simply call to return it within 15 days of receipt for a complete refund.

Ordering Information

Product #	Item	Price	Shipping
AM1200-C1	Amazing Things 1200 Baud Internal Modem	$99	$5
TM24-C1	Fast Track 2400 Baud External Modem	$239	$7

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Unlimited Storage!

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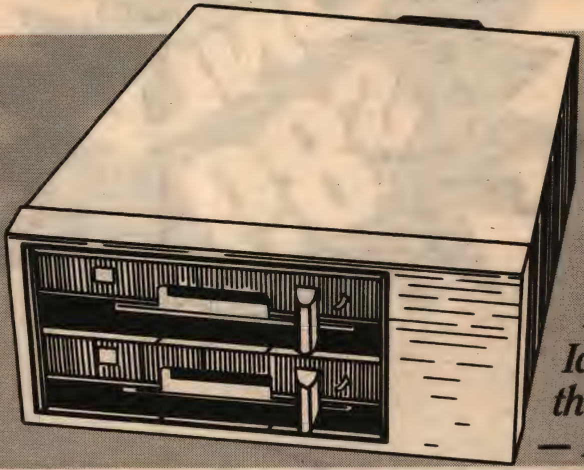
"Bernoulli" Storage System

FROM $995



For IBM PC, XT, AT, and Compatibles

Made by IOMEGA — Completely Identical to The Bernoulli Box, Except for the Color of the Box and the Label — At About ½ the Price!

4 Systems Available

Single Removable 10 MB System	$995
Dual Removable 10 MB System	$1495
Single Removable 20 MB System	$1329
Dual Removable 20 MB System	$1849

Controllers

(Required for operation)

Controller for IBM PC, XT, AT & Bootable Software *(Allows you to boot DOS from Genie Box.)*	$189
Controller for IBM PC, XT, AT & Non-bootable Software *(Must boot DOS from floppy or hard disk, then access Genie Box.)*	$139

Cartridges

(Available with or without purchase of Genie Box.)

Single 10 MB Cartridges	$69
3-Pack 10 MB Cartridges	$149
Single 20 MB Cartridges	$79
3-Pack 20 MB Cartridges	$179

* The Bernoulli Box is a registered trademark of IOMEGA Corporation.

100% Compatible with The Bernoulli Box— Guaranteed Cartridge Interchangeability.

SPECIFICATIONS

SYSTEM

Data Transfer Rate	As fast as host allows— up to 1.13 Mbytes/second	
Voltage	115 VAC 60 Hz	
Capacity-User Available	Model G110H	10 Mbytes
	G210H	20 Mbyes
	G120H	20 Mbytes
	G220H	40 Mbytes
Start/Stop Time	5/7 seconds	
Average Access Time	Model G110H	35 ms
	G210H	35 ms
	G120H	38 ms
	G220H	38 ms

CARTRIDGE

Formatted Capacity	Model G110H	10 Mbytes
	G210H	10 Mbytes
	G120H	21.4 Mbytes
	G220H	21.4 Mbytes
Spare Capacity	Model G110H	.9 Mbytes
	G210H	.9 Mbytes
	G120H	1.8 Mbytes
	G220H	1.8 Mbytes
Shock	Cartridge can be dropped from 36″ maximum onto a smoother, clean, hard surface	

DIMENSIONS

	HEIGHT	WIDTH	DEPTH
Subsystem	160mm (6.32 in.)	317.5mm (12.5 in.)	387.4 (15.25 in.)
Cartridge	18mm (0.71 in.)	209mm (8.23 in.)	280mm (11.02 in.)

100% Satisfaction Guarantee

6 month warranty from Genie Technology plus 15 day trial. If you are not satisfied with this storage device for any reason, simply call to return it within 15 days of receipt for a complete refund.

Ordering Information

Product #	Item	Price	Shipping
G110-C1	Single 10 MB Genie Box	$995	$27
G210-C1	Dual 10 MB Genie Box	$1495	$27
G120-C1	Single 20 MB Genie Box	$1329	$27
G220-C1	Dual 20 MB Genie Box	$1849	$27
G500-C1	Genie Box Controller w/Bootable Software	$189	$7
G510-C1	Genie Box Controller w/Non-bootable Software	$139	$7
G410-C1	Single 10 MB Cartridge	$69	$7
G430-C1	3-Pack 10 MB Cartridges	$149	$7
G820-C1	Single 20 MB Cartridge	$79	$7
G860-C1	3-Pack 20 MB Cartridges	$179	$7

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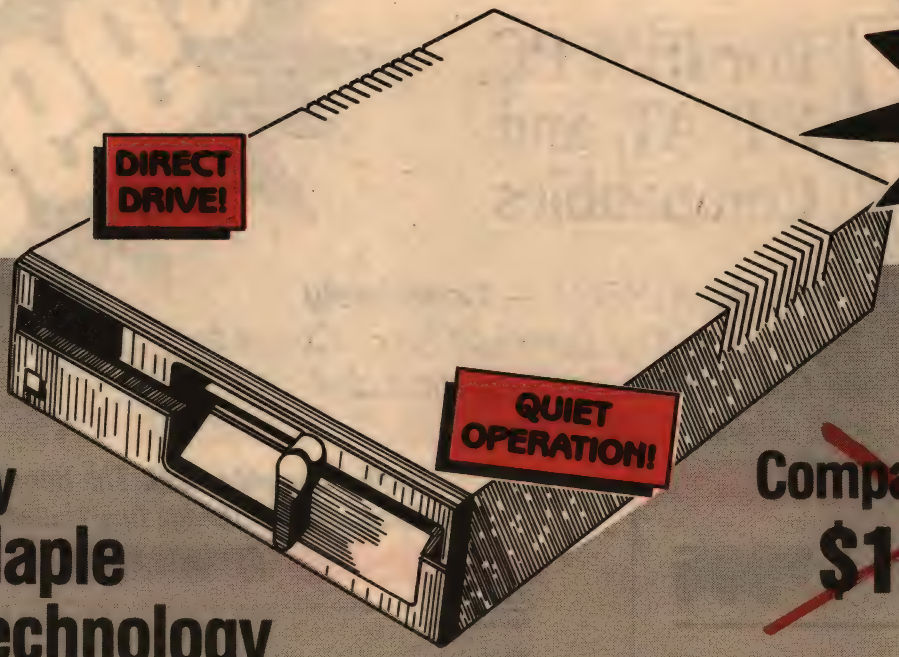
Apple II Disk Drive

ONLY $89


DIRECT DRIVE!
QUIET OPERATION!

Model MT-501A

Made by Maple Technology

~~Comparable Price $129.00~~

- Completely Apple Compatible—Works With Apple II, Apple IIe, and II+

Also works with Apple IIc & IIgs
-- See ordering information

- Brushless Direct Drive Motor!
- Plugs Directly Into Apple Disk Controller—No Modification Needed!
- Space Saving Trimline Half Height Design!
- 1 Year Warranty!

100% Satisfaction Guarantee

1 year warranty from Maple Technology plus 15 day trial. If you are not satisfied with this drive for any reason, simply call to return within 15 days for a complete refund.

Specifications

- ***Cable for Apple II, IIe, II+ Included***
- ***Flip Style Door Handle***

Disk Type: 5¼″ Single Sided Floppy
Storage Capacity: 164K formatted
Compatibility: Apple II, IIe, II+ and compatibles
Data Transfer Rate: 250 KBPS
Access Time: < 6 msec
Number of Tracks: 40
MTBF: 8,000+ hours at 25% duty cycle
Dimensions: 5¾″(W) x 1⅝″(H) x 8″(D)
Weight: 1.85 kg

Ordering Information

Product #	Item	Price	Shipping
MT501-C1	Maple Apple II Disk Drive	$89	$12
CA600-C11	Apple IIc & IIgs Adapter	$19	FREE SHIPPING WITH DRIVE ORDER

Note: Model and specifications subject to change. Call to confirm before ordering.

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TOSHIBA Floppy Drives

For IBM PC's, XT's and Compatibles

ONLY $79

HALF HEIGHT

These are the same high quality drives that Leading Edge uses in their Model "D" computer.

TOSHIBA FD 5445

- 5¼″ Double Sided, Double Density
- 360K Formatted Capacity
- 48 TPI
- Direct Drive Brushless Motor
- Space Saving Half Height Design
- Low Power Consumption
- Beige Front Face Plate
- Works with Standard PC/XT Floppy Drive Controller

SPECIAL OFFER!

ONLY $69 EACH

We're offering a discount on quantity 12 purchases, since these drives come to us in cartons of 12. A great deal for corporations, user groups, dealers, etc.

Save an extra $72 on shipping — only $2 each!

100% Satisfaction Guarantee

90 day warranty plus 15 day trial. If you are not satisfied with this disk drive for any reason, simply call to return it within 15 days of receipt for a complete refund.

Ordering Information

Product #	Item	Price	Shipping
TD360-C1	Toshiba FD 5445 Floppy Drive	$79	$8
TD399-C1	12 Toshiba FD 5445 Floppy Drives	$828	$24

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Top Rated Desktop Organizer

DeskSet

For IBM PC's and Compatibles

~~List Price $169.00 DeskSet Plus~~

ONLY $29

Software Digest *"Overall Best"*

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You Get All This For Only $29

Pop-Up Notepad with Address Book and Appointment Scheduler

- Take notes anytime, even within a file, and save them or transfer them to an application
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- Cut & paste within or between applications
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- Automatically dials from address book, data base, or on-screen entry, even while you're in another program

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- Run any program while within another program
- Pop up 7 most commonly used DOS commands
- Access second DOS

Pop-Up Alarm Clock

- Sets alarms and displays messages, even if you're using another program
- Set your computer to run programs when you're not there
- Stop watch and elapsed time features

Pop-Up Calendar

- Views and prints one month or three months at a time
- Highlights significant dates
- Cycles and lists a total of 200 messages

Pop-Up Calculator

- Advanced financial and statistical functions
- On-screen printable tape
- 10 Memories
- Dollars & cents mode

Also Available $29

Pop-Up Telecommunications

- Connects to on-line data service while in another application
- Sends text directly from on-line service to application program
- Send and receive binary and text files
- Return to application and remain logged on

DeskSet Plus

ONLY $39

Pop-Up DeskSet Plus includes all the features of the Pop-Up DeskSet, plus Pop-Up Telecommunications.

Pop-Up DeskSet Plus was rated the #1 Desktop Organizer by Software Digest in their June 1986 issue. Other programs rated include Borland's SideKick, Lotus' Spotlight, Electronic Arts' Get Organized, and PC Desk. Software Digest is an independent publication which accepts no advertising.

Pop-Up DeskSet Plus was also selected as the PC Magazine Editor's Choice Desktop Organizer in the May 27, 1986 issue.

100% Satisfaction Guarantee

Free telephone help from Popular Programs plus 15 day trial. If you are not satisfied with this software for any reason, simply call to return it within 15 days of receipt for a complete refund.

Ordering Information

Product #	Item	Price	Shipping
PU100-C1	Pop-Up DeskSet	$29	$5
PU200-C1	Pop-Up DeskSet Plus	$39	$5
PU300-C1	Pop-Up Telecommunications	$29	$5

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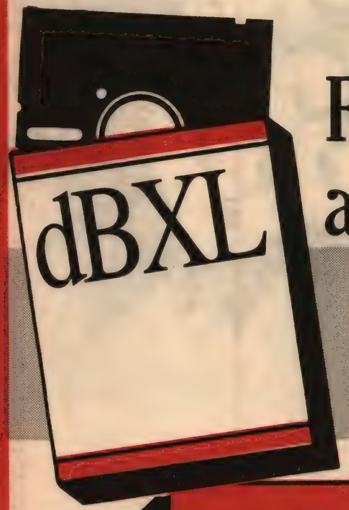
The Only Full dBase III Plus Clone

ONLY $99



For IBM PC's and Compatibles

~~Comparable Price~~

~~$429.00~~

(dBase III Plus retail)

From WordTech Systems

All the Features and Functions of dBase III Plus, plus Enhanced and Additional Features, At Less than 1/4 the Price!

- **100% Compatible with dBase III Plus**—Use your dBase III Plus files with dBXL, and vice versa
- **Same Commands as dBase III Plus**—Users familiar with dBase III commands will be completely comfortable with dBXL
- **Runs All Programs Written in dBase**
- **No Copy Protection**
- **Better Help Screens Than dBase III Plus**
- **Better Tutorial Than dBase III Plus**
- **Improved Error Messages**—Tells you what your error was, not just that you made one
- **Allows Up to 10 Simultaneously Open Files**
- **Full Compatibility with dBase III Compilers**—Including Quicksilver and Clipper
- **Built-In Windowing**—Without additional software such as Microsoft Windows
- **1 Hour Free Technical Support**
- **In Addition, dBXL Offers Several Enhanced dBase III Plus Commands**—Plus commands and utilities not found in dBase III Plus

dBXL is the only full dBase III Plus work-alike available today. It is guaranteed to be 100% compatible with dBase III Plus. It is made by WordTech, a well respected publisher of dBase compilers, including QuickSilver.

In addition to the dBase III Plus features, the features that dBXL adds to dBase III Plus makes it one of the most versatile database managers available. And, at less than one quarter of the price of dBase III plus, it's clearly one of the best software bargains on the market!

100% Satisfaction Guarantee

If you are not satisfied with this software for any reason, simply call to return it within 15 days of receipt for a complete refund.

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Please specify **Product #DB333-C1 when ordering. Add $5 shipping and handling per package.**

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BCE Lotus Look-Alike!

MOSAIC
the TWIN

Lotus 1-2-3®
Look-Alike

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~~$145.00~~

ONLY $39

The Twin

New Updated Version!

For IBM and All Compatible Systems

- Reads and Writes Lotus Files
- Superior Graphics To Lotus
- Work Area—256 Columns by 8,092 Rows (Same as Release 2 of Lotus)
- Supports 8087/80287 Math Coprocessors
- Compatible With Lotus 1-2-3 Release 1A
- Not Copy Protected
- Free Customer Support
- 1 Year Warranty

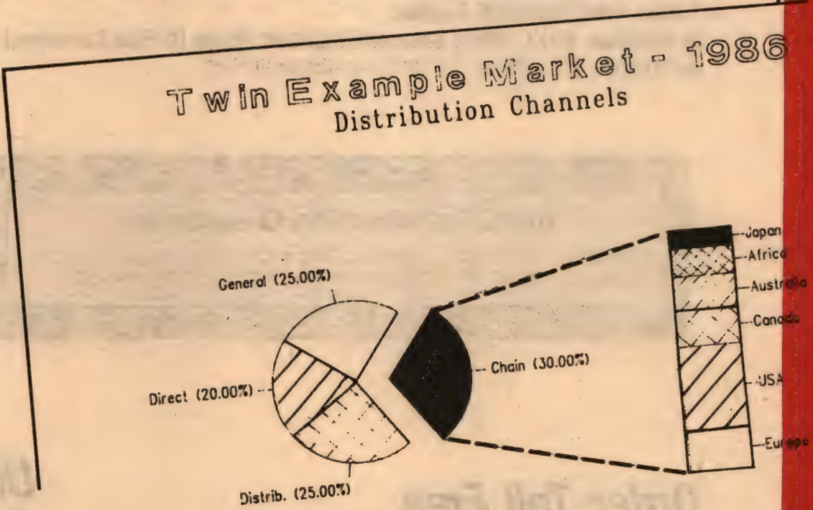
Specifications

• 255 by 8192 worksheet area • Macros, both keyboard and global with iteration and user defined • Macro compatibility • Reads and writes 1-2-3 data files directly • Financial Functions: FV, PV, PMT, RATE, MIRR, NPV, IRR, NPER • Statistical Functions: MIN, MAX, STD, VAR, COUNT, SUM, AVG • Database Statistical Functions: DSUM, DAVG, DCOUNT, DVAR, DSTD, DMIN, DMAX • Logical Functions: #NOT#, #AND#, #OR#, TRUE, FALSE, IF, AND, OR, NOT, ISNA, ISERR, >, <, =, >=, <=, < > • Mathematical Functions: +, –, *, /, ACOS, ATAN, ASIN, COS, TAN, SIN, ABS, EXP, INT, LOG, MOD, PI, ROUND, SORT, ATN ±, SQRT, RAND LN • Selection Functions: CHOOSE, HLOOKUP, VLOOKUP • Date Functions: DATE, TODAY, DAY, MONTH, YEAR • Translate data from other programs without exiting program • Configure hardware with easy to use input from screen, without exiting program • Flexible color definition of the TWIN on your screen • Print Headers and Footers with date and page number functions

• Graphics created directly from spreadsheet data • Pie charts 2-D, 3-D • Pie-Bar combination • Colors and shading definable for each slice • Slices can be exploded • Vertical bars 2-D clustered, 2-D stacked, 3-D clustered • Colors and shadings for bars user definable • Bar top labels • X-axis, Y-axis, and grids are optional • Line charts of up to 8 lines per chart • Color and line type for each line is user definable • Linear or LOG axis in any combination • All charts have 3 lines of titles and 3 lines of footnotes. Each 8 sizes, 8 different colors, different fonts, left-center-right justified • 11 different text fonts • Plotting with plotters on paper or transparency • Hercules and color monitors supported • Simultaneous display on 2 monitors • 2 level graphics. Analysis and Presentation • Special "FILL-IN-THE-BLANKS" INPUT FORMS • On screen slide presentation • Print and plot without exiting program.

Requires 320K RAM.

> "The Twin has it all over 1-2-3 when it comes to graphics capabilities, offering both analysis and presentation quality graphics."
>
> "The Twin adds a few features that big brother [Lotus] might be jealous of."
>
> **—PC Magazine, August 1986**
>
> "Anyone who uses release 1A of 1-2-3 would be completely at home working with Twin."
>
> **—PC Week, May 6, 1986**



100% Satisfaction Guaranteed

Unprecedented! We Trust You!

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From MOSAIC SOFTWARE INC.

~~Framework $695.00~~ ~~Lotus Symphony $695.00~~

FROM $59

INTEGRATED 3

INTEGRATED 3

1 *Twin Spreadsheet*
Lotus 1-2-3 Look-Alike
(See ad on opposite page.)

2 *Word Processor*
(See description below.)

3 *Presentation Quality Graphics*

ONLY $59

INTEGRATED 7

INTEGRATED 7

- Extremely Easy to Use Menu-Driven System
- Not Copy Protected
- Supports the 8087 Math Co-processor
- Supports Dual Monitor Displays, so Graphics Can be Displayed on a Color Monitor while Text is Displayed on a Monochrome Monitor
- Allow DOS Access from Within the Program
- Previously Sold for Up to $695.00

1 *Twin Spreadsheet*
Lotus 1-2-3 Look-Alike
(See ad on opposite page.)

2 *Word Processor*
- 35,000 Word Dictionary
- Tabs and Margin Settings
- Search and Replace
- On-screen Bolding and Underlining
- Access Another Application While Still In Word Processor
- Import Data from Database and Spreadsheet

3 *Relational Database Manager*
- Handles up to 100,000 Records per File
- Sort Files on Multiple Keys
- Allows 2 Files to be Joined—Symphony Can't

4 *DataMail*
- Merges Database Files with Word Processor Documents for Mass Mailings—Symphony and Framework Don't Have This Capability

5 *Presentation Quality Graphics*
- All the Outstanding Graphics Features of Twin *(See ad on opposite page.)*

6 *Terminal Emulation*
- Emulates IBM 3101, DEC VT-52, DEC VT-100

7 *PC-to-PC Communications*
- Communications up to 9600 baud—Symphony and Framework only go up to 1200 baud

ONLY $79

Both General Motors and NASA selected integrated 7 as their integrated software package at a time when Integrated 7 retailed for $495.00

100% Satisfaction Guarantee
If you are not satisfied with this software for any reason, simply call to return it within 15 days of receipt for a complete refund.

Ordering Information

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MI777-C1	Integrated 7 Software Package	$79	$8

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Complete Business Graphics Package!

CHARTMAN
MOSAIC
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CHARTMAN

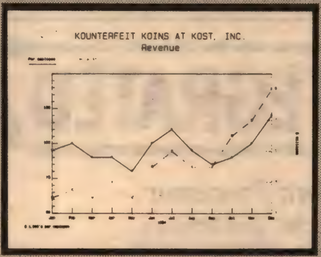
From MOSAIC SOFTWARE INC.

For IBM PC's and Compatibles

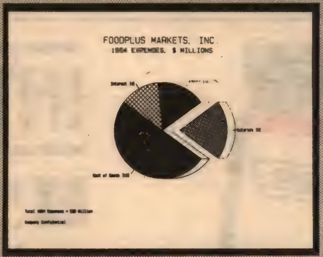
ONLY $39

~~Mfr. Retail $99.00~~

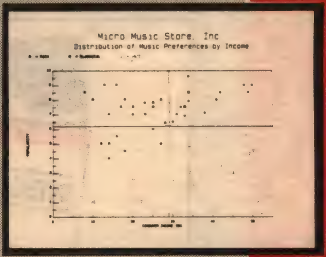
Software Digest recently ranked Chartman second in a field of 17 business graphics packages, trailing only a product priced significantly higher.



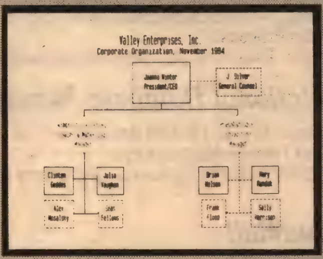
Line Graphs



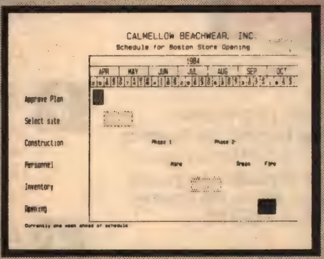
Pie Charts



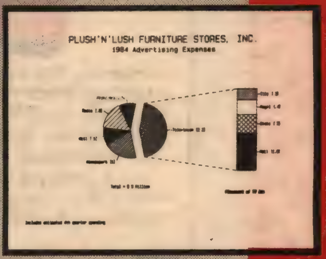
Scatter Charts



Organizational Charts



Gantt Charts



Combinations

And Many More . . .

- Chartman offers significantly more types of charts than other programs
- "Fill-in-the-Blanks" Input Forms make Chartman the easiest to use.
- Also imports data from ASCII and DIF files.
- On screen HELP.
- Multiple charts on one page.
- Plots on paper or transparency.
- On screen SLIDE presentation feature.
- Supports monochrome or color monitors, IBM printers, HP plotters and compatibles.

"Unbelievable..."

"The graphics capabilities of 1-2-3 are limited...Other dedicated IBM PC graphics packages, such as the outstanding CHARTMAN II, offer these capabilities and more."

"A complete graphics package."

"CHARTMAN's easy-to-use and effective installation program is typical of the entire package."

—PC Magazine

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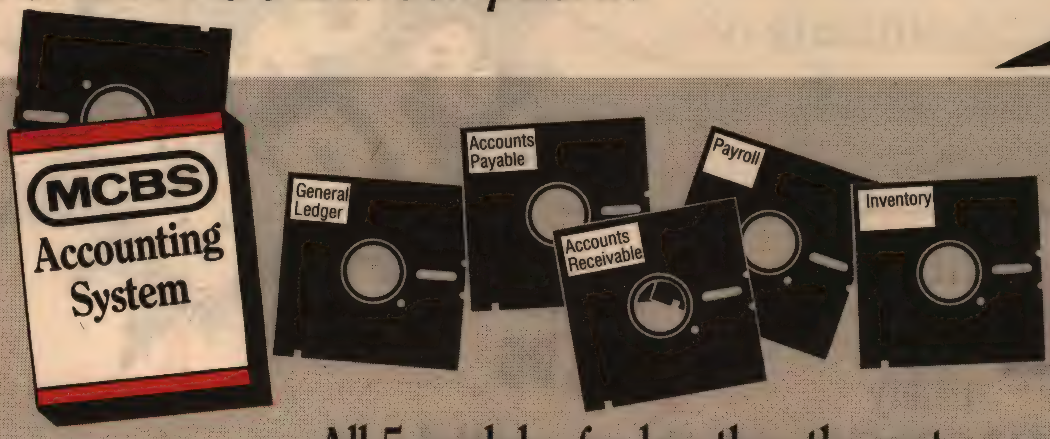
Complete Integrated Accounting System with Payroll

For IBM PC's and Compatibles

Complete System **$39**



Made by
MCBS
Micro-Computer Business Services

All 5 modules for less than the cost of one module of a comparable system.

General Features

- New automated start-up and installation procedures minimizes use of DOS commands.
- Menu driven system.
- Creates subdirectories and copies all files to fixed disk when used with fixed disk.
- Simplified installation.
- Complete audit trails.
- Data files can be accessed by Lotus, dBase, etc.
- Create as many copies of the manual as you like from the diskette.
- Not copy protected, can be used on hard disk.
- Accounts and transactions limited only by disk space.

General Ledger

- Supports multiple departments.
- Flexible charts of accounts.
- Prints financial statements in flexible user defined formats.
- Prints Income Statement and Balance Sheet by current month, current quarter, and previous 3 quarters.
- Prints Departmental Income Statement and Balance Sheet by current month, current quarter, and previous 3 quarters.
- Prints Trial Balance and chart of accounts.
- Data Entry screen displays beginning, current and ending balances as well as the last 10 entries.
- System allows new accounts to be created during data entry.

Accounts Receivable

- Customize your own headings on Invoices and Credit Memos.
- Add finance charges at the rate you choose to accounts you wish to charge.
- Provides for entry, updating, and deletion of customer information.
- Allows entry, editing, and posting of receivables, credit memos, and cash payments.
- Prints the open items and aged receivables report.
- Prints Invoices, Credit Memos and Statements.
- Supports partial payments.
- Prints Invoices, Payment and Credit Memo Registers.

Accounts Payable

- Vendors may be added to the system during the entry of invoices.
- Provides for entry, updating and deletion of vendor information.
- Allows entry, editing, and posting of payables, adjustments, cancellations, and prepaids.
- Prints A/P checks.
- Prints check register.
- Prints the A/P distributions to the General Ledger.

Payroll with State & Local Taxes

- Now prints W-2 and 1099-Misc forms information.
- Handles hourly, salaried or commissioned employees on weekly, biweekly, semi-monthly or monthly pay periods.
- Calculates Federal, State, and Local taxes.
- Allows user to maintain all tax tables.
- Calculates the payroll.
- Prints the payroll register, check register, and deduction register.
- Prints payroll checks.
- Prints W-2's, 1099's, and quarterly earnings reports.

Inventory with Order Entry & Purchase Orders

- Adds customers, vendors, or items without leaving the entry screen you are working with.
- WILD CARD customer feature allows creation of walk-in customer account for Point of Sale invoicing.
- WILD CARD item allows for billing miscellaneous non-inventory charges.
- Provides for order entry and editing with inventory update during entry.
- Stock and non-stock items.
- Handles purchases, returns, shipments and adjustments.
- Prints on preprinted forms or plain paper.
- Prints invoices, credit memos, picking tickets, purchase orders, price lists, and shipping labels.
- Performs book to physical analysis.

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Condensed	Sub$_{\text{scripts}}$
Emphasized	Underlines
Italics	

- Works With Any Epson Compatible Printer

"Can you imagine a computer without SmartKey? I can't and I have a vivid imagination."
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Leading Edge® Word Processor

For IBM and All Compatible Systems

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Lowest Prices Anywhere!

Basic & Simple Version Mfr. Retail $~~100.00~~ **$29**

With Spelling Checker and Merge/Print Options Mfr. Retail $~~250.00~~ **$39**

> "The Leading Edge Word Processor offers the best balance of user friendliness, performance and features of all the programs tested."
>
> **— Software Digest, January 1986**
>
> Software Digest is an independent publication which accepts no advertising. Other programs tested included WordPerfect, Volkswriter Deluxe, WordStar 2000 Plus and Microsoft World.

> "This program is a gem, and at $250, it's also a gem of a bargain!"
>
> **—PC Magazine, January 28, 1986**

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Unprecedented!

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- Merges paragraphs
- ✓ Merge/Print supports dBase II files
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Allows you to check spelling using 20,000 word dictionary.

plus...

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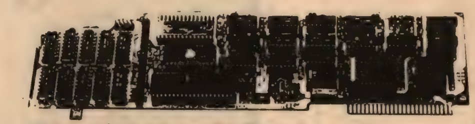
Version 1.01

Creates indices and tables of contents.

plus...



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Best on the market! Lets you run thousands of CP/M programs! Z80B processor, 6 MHz, 70 column display without an 80 column card (or 80 columns with an 80 column card).

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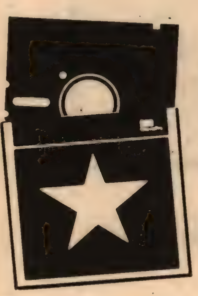

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Version 3.3

Creates mailing lists, merges files.

plus...

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Available Separately

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Includes WordStar, SpellStar, MailMerge, StarIndex.

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100% Satisfaction Guarantee

One year warranty from MicroPro plus 15 day trial. If you are not satisfied with this software for any reason, simply call to return it within 15 days of receipt for a complete refund.

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AP618-C1	Appli-Card CP/M Board & CP/M 22 for Apple II, IIe, II+	$49	$8

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- 90 Day Warranty

** In some compatibles the slots are so close together that drive may block ajdacent slot.*

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90 day warranty from Tandon plus 15 day trial. If you are not satisfied with this drive for any reason, simply call to return it within 15 days of receipt for a complete refund.

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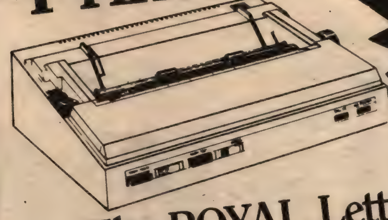

The ROYAL Letter Master

Works with IBM, Apple, etc.

- 10 CPS Bi-Directional Printing
- Print Pitch and Line Feed Selector
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- Print Line Width 6.6 Inches
- Parallel Interface

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33 CPS Wide Carriage Letter Quality Printer

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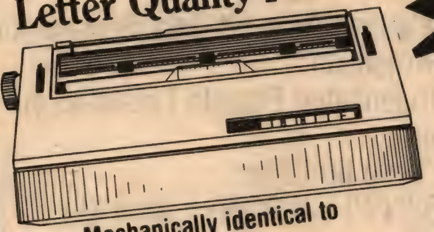

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Mechanically identical to the Brother HR-35

Parallel and Serial Models Available

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- 90 Day Warranty

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Product #BR35S-C1, add $22 shipping.

40 CPS Wide Carriage Letter Quality Printer

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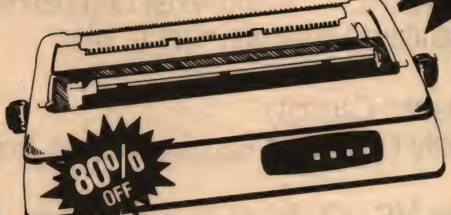

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FACIT 4565

Made by TEC (*Manufacturer of C.Itoh Starwriter F10-40*)

This printer is mechanically identical to the Commodore 6400 printer that we have sold for the past 9 months.

- Uses Diablo Printwheels and Ribbons
- Parallel Interface
- Diablo 630 Compatible

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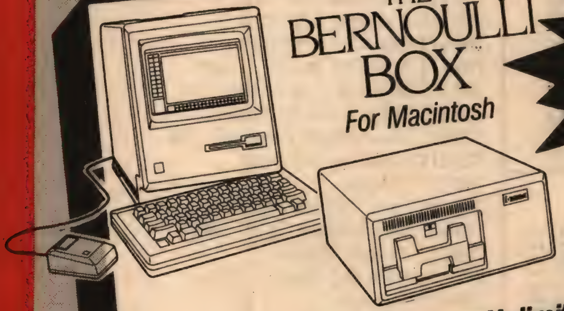

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It's Like Having an Unlimited Supply of Removable 5 MB Hard Disks!

- Works with All Macintosh Models (Special cabling required for use with Mac Plus and Imagewriter II printer. Ask operator for details.)
- Average Access Time — 50 ms
- Capacity — 5 MB Per Cartridge

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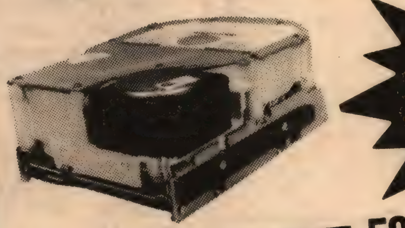
1 5 MB Cartridges — $59 + $7 shipping.
3 5 MB Cartridges — $99 + $7 shipping.

Cartridges available w/Bernoulli Box only.

10 MB Hard Drive



ONLY $99

Tandon 502

- For IBM PC, XT, and Compatibles
- 10 MB Formatted Capacity
- Full Height
- Works with Western Digital and Many Other Controllers

This is the same drive used in the original IBM PC/XT.

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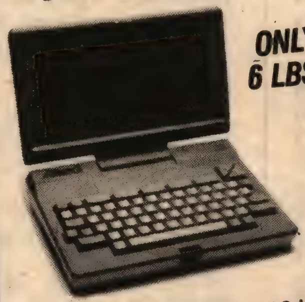

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- Built-In Modem (300 bps)
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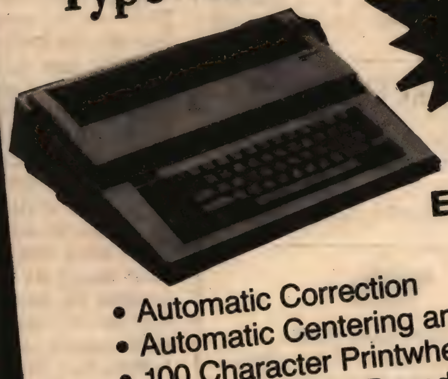

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1800-45	Dual 34 card edge cable; cable is 10" long	$2
1800-99	DB-9 male to male-2' long	$2
1800-85	TI game cable-6' length DB-25S to dual DB-15S connectors	$4
1800-87	TI casette interface cable DB-9S to 3 RCA Phono Jacks	$2.50
1800-70	Coiled cord-4 conductor-6' no connector on either end	$1.50
1800-72	Coiled cord-4 conductor-6' telephone jack to 5-pin din plug	$3
1800-75	AC line cord-2 cond. 6'	$0.25
1800-76	AC line cord-3 cond. 6'	$0.50
1800-55	Commodore Pwr sup. cab. din jack	$3
1800-43	7 cond. round cab.-6' -22 awg	$2
1800-44	12 cond.round cab.-6'-22 awg	$2.50
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7000-630	Xerox printer Bd. has Z80 Proc. chip set plus dozens of LS IC,S!	$4
7000-200	Calculator Bds. has linear & CMOS parts galore.	$2
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7000-250	RF Oscillator & Amplifier board. Many high frequency parts.	$3.50
7000-150	Complete circuit bd from telephone. has mic, tsistors, & many parts.	$2
7000-024	24V regulator board	Call
7000-100	Sound Gen. bd from pin ball game, OSC, 2 watt amp. plus schematic	$2
7000-550	Main circuit board from TOCOM model 55 cable converter	$4.95

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3725-500	Motorola 7" Monitor. TTL requires 12.5VDC @ 1.5 AMPS	$20
3725-640	Commodore replacement composite monitor, requires 17Vac.	$20

SURPLUS COMPUTER KEYBOARDS

3600-640	Commodore 64 Replacement keyboards	$14
3600-099	Replacement keyboard for TI 99-4A computer, also use on Timex 1000	$3.95
3600-920	Microswitch 92 key keyboard ASCII encoded, #92SC40-16-1	$8.95

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TI 990 main chasis-power supply w/card cage, Stk. #990-main	$99
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Omni 800 printer Mod. 820 KSR serial printer in working cond. Stk. #KSR-820	$149
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An assortment of 10 Atari game ROMs. Simply open any Atari cartridge & replace the existing ROM with a new one. Play another 10 games instantly.

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Disk for V-20

Processor $3.75

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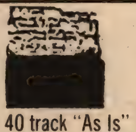

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900-218	AT Mntng rails	$3
900-220	Dual drive mntng bracket	$2

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1500-860	IBM PC-JR replacement trfmr. output: 17, VAC @ 75VA	$9.95
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1500-300	TI Calculator Tfmr., -6 VDC @ 300 MA.	$1.75
1500-243	Milton Bradley Toy Tfmr. -12 VAC @ 1.7 AMP	$4.95
1500-116	Commodore C116 Repl. trfmr. 9.5 VDC @ 1 AMP.	$4.95

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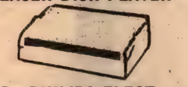
Vinyl diskette Holder

Holds 2-5¼" diskettes. Has 3 hole punch to mount in standard loose leaf folder. Stk. #1 VIN-5 ....10/$2.50

For Standard 8½x11

LASER DISK PLAYER



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Orig. sold for $3500 Working cond. #LDP-100 ....

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Used as battery back-up on most multi-function cards.

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Holders for above 10/$5

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LS10	$.15
LS11	$.15
LS12	$.25
LS13	$.30
LS14	$.25
LS15	$.30
LS20	$.15
LS21	$.18
LS27	$.21
LS30	$.15
LS32	$.20
LS33	$.25
LS37	$.30
LS38	$.25
LS42	$.30
LS51	$.20
LS54	$.25
LS55	$.20
LS73	$.30
LS74	$.23
LS85	$.45
LS86	$.19
LS93	$.50
LS107	$.28
LS109	$.20
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LS122	$.35
LS123	$.42
LS124	$1.40
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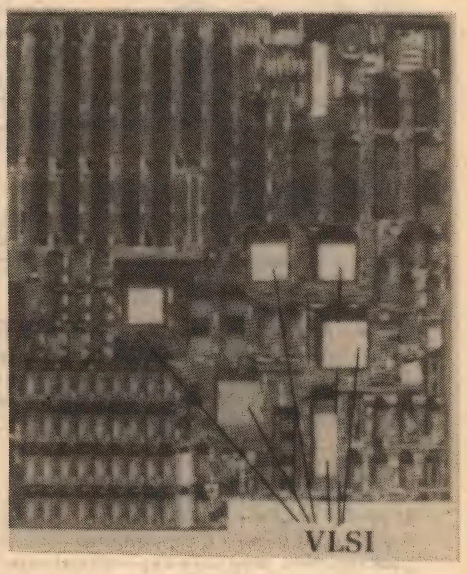

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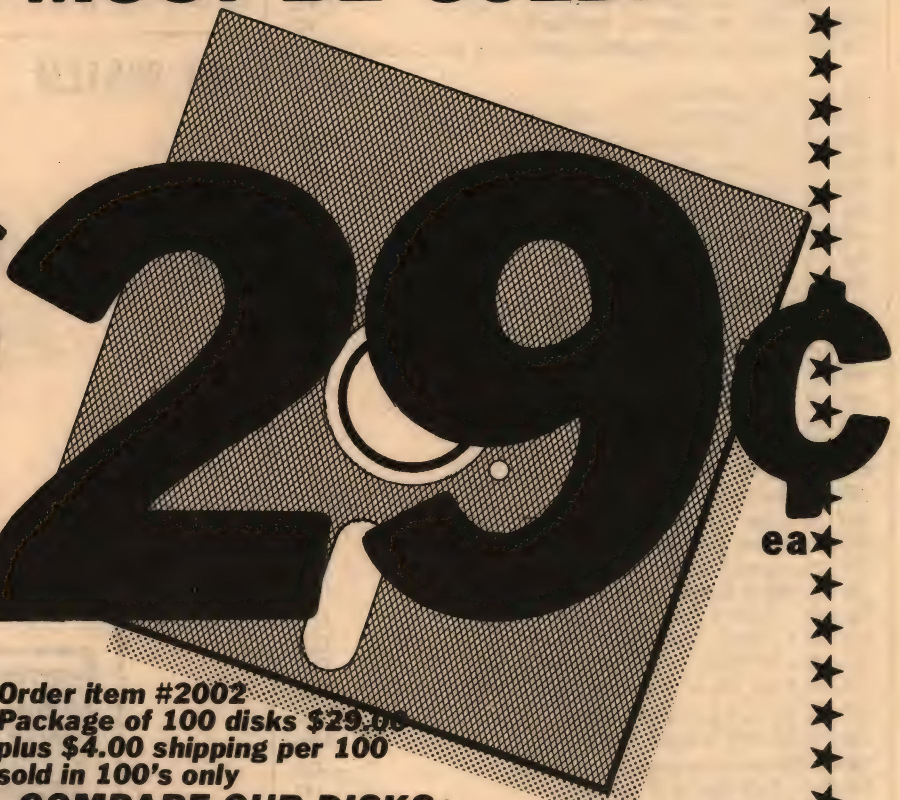

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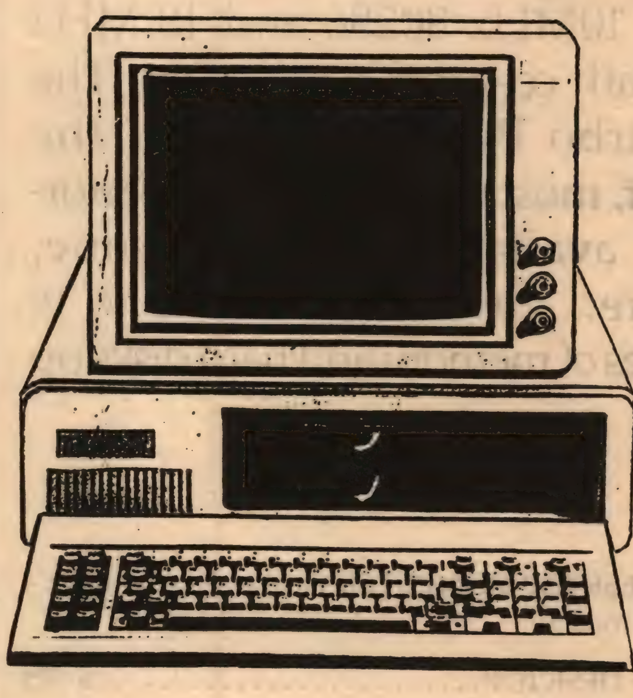

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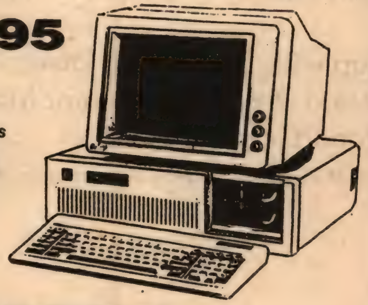

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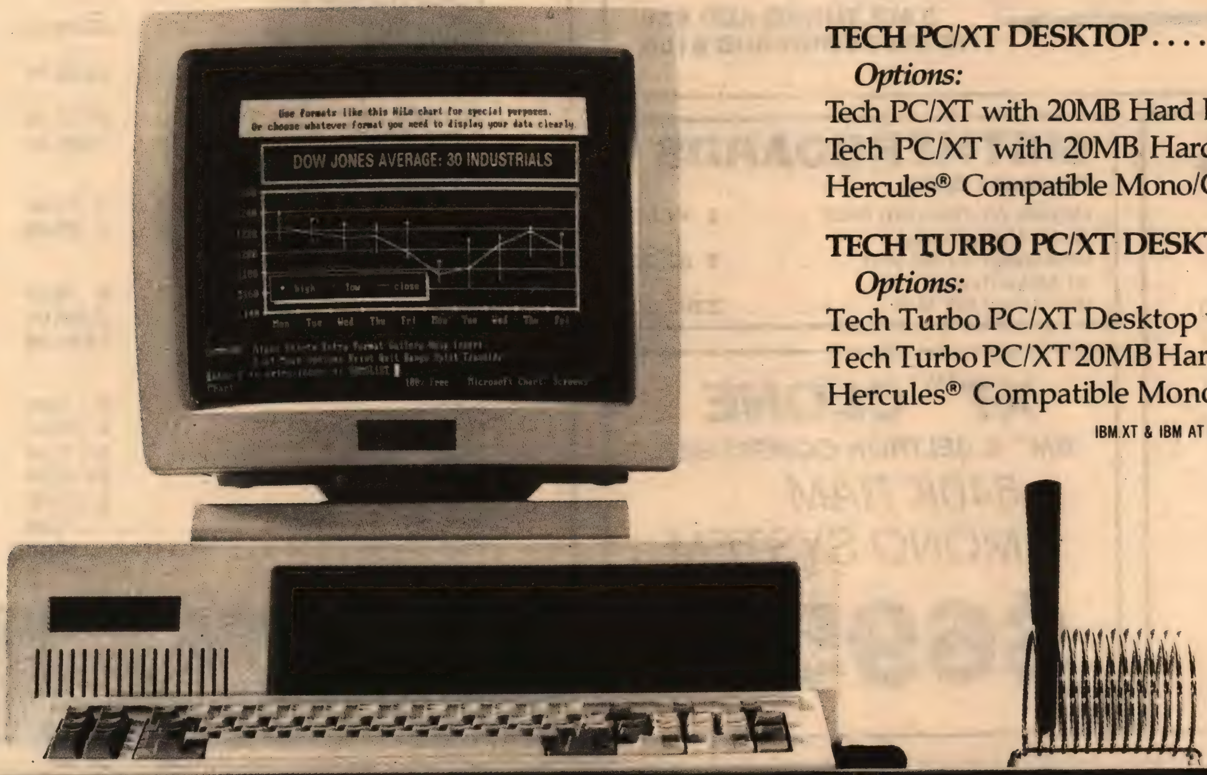
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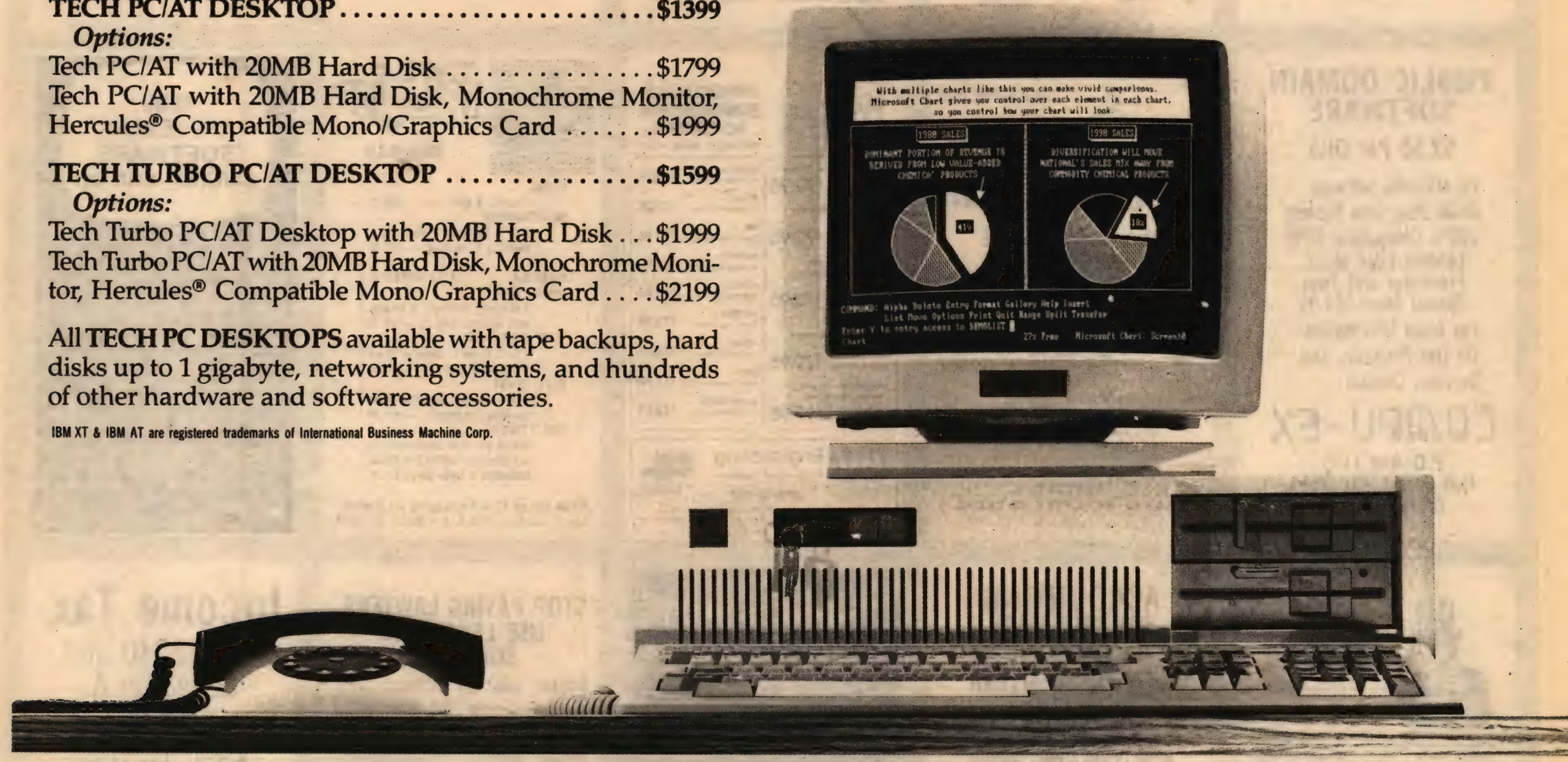
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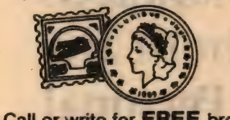

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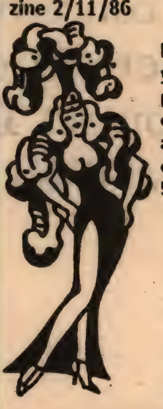

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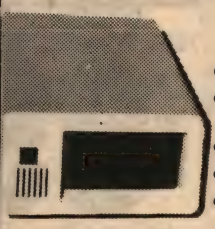

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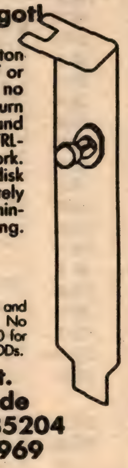

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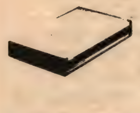

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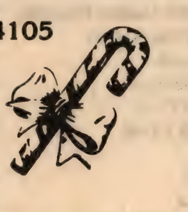

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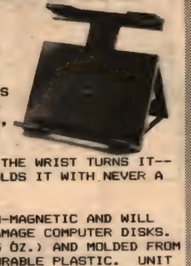

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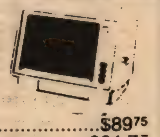

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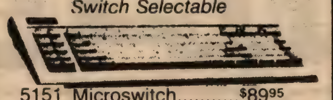

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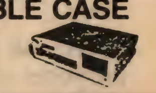

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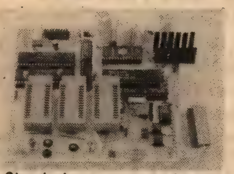

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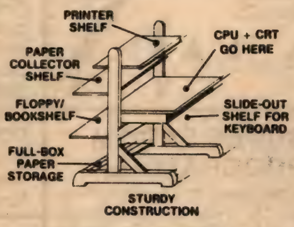

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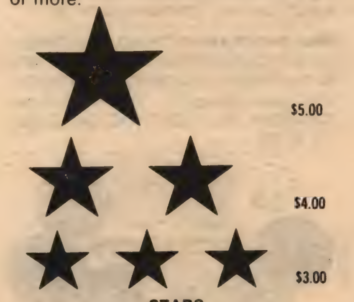

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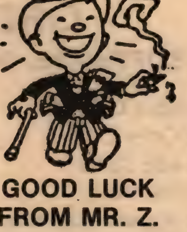

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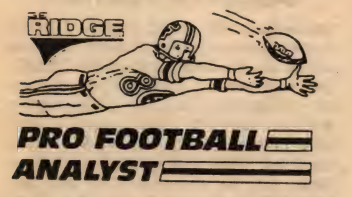

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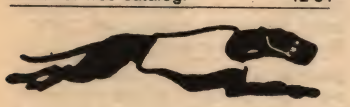

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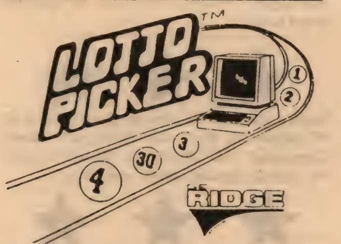

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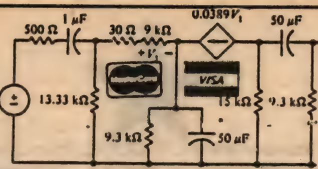

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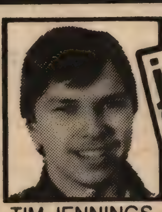

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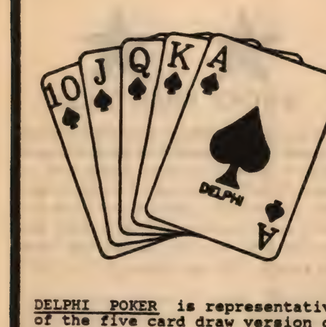

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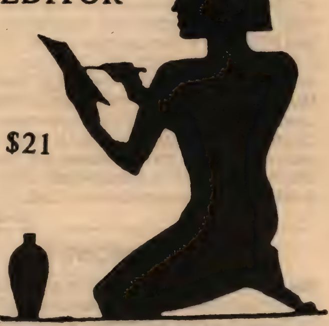

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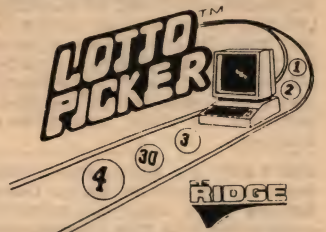

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QL Software! Matchpoint, Karate, Wanderer, Lands of Havoc, and QL Peintre. All originals with instructions and packaging. Each $20 or $85 for all five. **Bryan Wiederspohn,** 211 Unity St., Bellingham, WA 98225.

THE QL REPORT

A Monthly Newsletter published in the U.S. for QL owners and those interested in the QL. Software reviews, books, and hardware reviews, interviews with programmers and QL companies- and more. $15 for 12 issues. Published by: **Curry Computer,** PO Box 5607, Glendale, AZ 85312-5607. **602-978-2902.** 9-85

(126) MISCELLANEOUS MICROCOMPUTERS

ALL NEW: CSGD III

Character Sets Graphic Designs III offers outstanding graphic printing capabilities for 99/4A owners. You can easily create custom designed: letterheads using the tip and/or bottom of the page, labels in different sizes using various borders, and signs that are limited only by your imagination. Plus: print documents created with TI-Writer in any one of six full character fonts!!! Included in the three disk package are 25 fonts and 40 small graphics,all for only $17.95! Requires 32K, disk system, and either Epson or Prowriter compatible printer. Add $1.50 shipping. **Texaments,** 53 Center St., Patchogue, NY 11772. **516-475-3480.**

AT&T 7300

Unix/MS DOS, 512K memory, 20 MB hard disk, internal 1200 baud modem, 1 serial, 1 parallel port, swivel/tilt graphics monitor, keyboard, mouse, $3700. **603-783-4708.**

Fortune 32:16 multiuser computer, Mint 20 meg. HD, meg. RAM, software, terminal. 11021 Ridgemeadow, Dallas, TX 75218. **214-341-2906.**

IBM 5100 computer, 5130 printer, 5106 auxtape. Complete documentation RS-232, APL/Basic excellent system! $300. Trade?? **516-931-4187, Frank Pfeiffer,** 41 Westbury Avenue, Plainview, NY 11803. 01-85

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Micropolis/Vector Graphic Users Group Monthly newsletter, hardware, software. **205-881-1697,** 604 Springwood Cir., Huntsville, AL 35803-1740. 8-87

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SAGE II 2-800k Floppies, 512k, QUME 102 Terminal, p-System, Pascal, and complete manuals. Make offer. **Jim Watwood 602-277-1704** 8:00 to 5:00 PST. 01-85

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Televideo TS-802 Super Buy. Dual floppy computer with word-processing (WordStar), financial planner (CalcStar), and BusinessMaster accounting with CBASIC source code, all for $850. Mint—never registered. **Harry Beerman 219-639-3035.** 12-84

-The Computer Junkyard- Systems, Software, Hardware and parts at Surplus Prices. Send SASE for FREE list. **Mike Drum,** 3102 S. Home, Berwyn, IL 60402.

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V4/30 5 MB HD-630 KB floppy 8 or 16 bit; **V4/40** as above but with 10 MD hard disk; **V4S/ 30** as above but S. Sector 739 KB FD; **V4S/40** as above but with 10 MD HD; **NEC 7700Q** Printer 55 CPS Centronics Para; **C. Itoh F-10-40** 40 CPS Daisy Wh. w/tractor; All equipment is perfect and in original boxes and have word procl. and spr. sheet programs and more included. CP/M, MS-DOS. **M. Richman 813-885-1789.** 12-85

Vector 3005 complete 64k CPM manuals Jan. 82. Make offer. **Dexter Wilson,** 214 South Street, Waterloo, IA 50701. **319-236-0815**

Vector Graphic System 3-Model V3-5030 Terminal-CPU, DDW-5017 Ministore (ST-506 & floppy), MS-5033 Maxistore (Quantum 8" hard disk), best offer, all or part. **LEN 212-777-4353**

(127) XEROX COMPUTERS FOR SALE

Xerox 820-II, 5¼" + 8" disk drives, spare set 5¼" drives. Complete set spare parts, CPU, Co-processor, daughter board, monitor, power supply. All excellent shape. Make reasonable offer. Any-All. **Craig Reinhardt,** 12894 Charing Cross, Carmel, IN 46032. **317-848-1826.**

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Xerox 820II with 2-8" drives. Excellent condition. WordStar, Supercalc Mailer, other software included. Days: **Richard or Dawn, 305-891-2421.** 12-84

(127A) XEROX COMPUTERS WANTED

(127B) XEROX SOFTWARE, PERIPHERAL

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Composite video adapter board inputs Xerox video signals and outputs proper composite video for monitors. A&T PC board with all proper connectors. Requires minor soldering on the 820-1 $17.95. **Eugene M. Toner,** PO BOx 69, Fountainville, PA 18923. Check, M.O., VISA, MC. **215-249-0673** 9am to 5pm daily orders, 6:30pm to 10:30pm EST. Thursday for technical questions.

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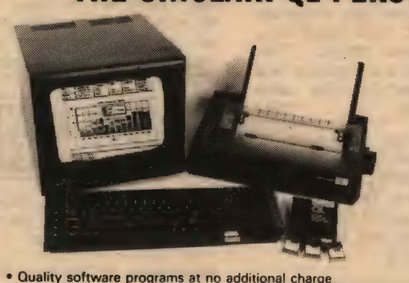

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Xerox 860-II, 16/8 computer for sale. Two 8 in. floppy drives. Make offer. **305-246-5728.**

(128) MISC. MICRO, SOFTWARE, PERIPH.

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Wanted: Victor 9000 CAD software, prefer AutoCAD or CAD9000. **Bill Houk,** 846 Parkside Blvd., Claymont, DE 19703.12-84

(129) S-100 COMPUTERS

ADC Super-Six (6-Mhz, Z-80, 128k) S-100 system; 10-slot Integrand chassis; 2-8" and 1-5¼" floppies; 15M hard disk w/controller; 1200B modem; ZCPR3/ZRDOS; assorted software; everything works perfectly; complete documentation; Asking $1250. Also: MicroDaSys Super-Z; Tarbell DD floppy controller; Make offer. Everything negotiable. **John Noonan,** 25269 Via Sistine, Valencia, CA 91355. **805-255-5833.** 12-84

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Godbout Econoram II 8k Static	$50
Mits 4k Static	$50
Mits 16k Static	$75
Mits 16k Dynamic	$75
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TCS 2708 PROM Boot	$25
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Redwood Research, 820 Redwood Drive, Nashville, TN 37220. **615-331-4743.**

Compupro 8085/8088, MI-286, (2) RAM22, Interface3, TM-100-4, Support1, Disk3, PCVideo, DiskI, DiskIA, (2) Qume 8" drives case & PS, 21 Slot motherboard & mainframe, Q540, Z-190 software $3900/offer. **305-678-5305.** 12-84

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Micropolis/Vector Graphic Users Group Monthly newsletter, hardware, software. **205-881-1697,** 604 Springwood Cir., Huntsville, AL 35803-1740. 8-84

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(131) S-50 COMPATIBLE, PERIPHERAL

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SK*DOS / 68K for hobbyist, industrial, dedicated, and other applications needing power and support at low cost,. Individual sales or OEM licenses, contact **Star-K Software Systems Corp.,** PO Box 209, Mt. Kisco, NY 10549. Call **914-241-0287** or Telex 5106016774. 12-85

(132) HEATH COMPUTERS FOR SALE

H-100 10-meg 768k green monitor, color capable, technical manuals, mint condition, ZPC Ver. 2. **Richard 919-787-7756,** 2101 Nancy Ann Dr., Raleigh, NC 27607. 01-85

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(132A) HEATH SOFTWARE, PERIPHERAL

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(133) BURROUGHS SYSTEMS

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(134B) HEWLETT PACKARD SOFTWARE, PERIPH.

HP-150 Software Lotus 123 $250; DBaseII $250; Condor 3 $350; Wordstar $200; Graphics $125; PCF $50; Memomaker $25; Diagraph $200; Multiplan $100; HP-125 Wordstar $75; Visicalc $100; Also HP-85 and HP-86 available. **800-826-6559.** California **800-221-4821. Audrey Barnes,** 11295 Camino Ruiz #7, San Diego, CA 92126. 01-86

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HP-85 ROMS for sale. Matrix assembler, I/O, Adv-PGM, and mass storage, all with manuals. Call **Don Lindley 205-721-1143.** 12-84

(136) DATA GENERAL SYSTEMS

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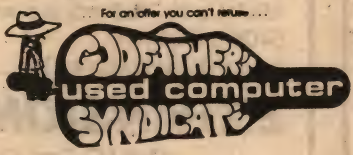

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7402	.29	.19	7486	.45	.35
7404	.35	.25	7489	2.05	1.95
7405	.39	.29	7490	.49	.39
7406	.39	.29	7493	.45	.35
7407	.39	.29	74121	.45	.35
7408	.35	.25	74123	.59	.49
7410	.35	.25	74125	.55	.45
7414	.49	.39	74126	.75	.65
7416	.45	.35	74143	4.05	3.95
7417	.45	.35	74150	1.35	1.25
7420	.35	.25	74154	1.35	1.25
7430	.35	.25	74158	1.59	1.49
7432	.39	.29	74173	.85	.75
7438	.39	.29	74174	.65	.55
7442	.55	.45	74175	.65	.55
7445	.79	.69	74176	.99	.89
7446	.89	.79	74181	1.95	1.85
7447	.89	.79	74189	2.05	1.95
7448	2.05	1.95	74193	.79	.69
7472	.75	.65	74198	1.85	1.75
7473	.45	.35	74221	.99	.89
7474	.45	.35	74273	2.05	1.95
7475	.49	.39	74365	.69	.59
7476	.45	.35	74367	.69	.59

74LS

74LS00	.29	.19	74LS165	.75	.65
74LS02	.29	.19	74LS166	.99	.89
74LS04	.35	.25	74LS173	.59	.49
74LS05	.35	.25	74LS174	.49	.39
74LS06	1.09	.99	74LS175	.49	.39
74LS07	1.09	.99	74LS189	4.59	4.49
74LS08	.29	.19	74LS191	.59	.49
74LS10	.29	.19	74LS193	.79	.69
74LS14	.49	.39	74LS221	.69	.59
74LS27	.35	.25	74LS240	.79	.69
74LS30	.29	.19	74LS243	.79	.69
74LS32	.35	.25	74LS244	.79	.69
74LS42	.49	.39	74LS245	.89	.79
74LS47	.99	.89	74LS259	.99	.89
74LS73	.39	.29	74LS273	.89	.79
74LS74	.35	.25	74LS279	.49	.39
74LS75	.39	.29	74LS322	4.05	3.95
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74LS85	.59	.49	74LS366	.49	.39
74LS86	.35	.25	74LS367	.49	.39
74LS90	.49	.39	74LS368	.49	.39
74LS93	.49	.39	74LS373	.79	.69
74LS123	.59	.49	74LS374	.79	.69
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74LS138	.49	.39	74LS590	6.05	5.95
74LS139	.49	.39	74LS624	2.05	1.95
74LS154	1.09	.99	74LS629	2.29	2.19
74LS157	.45	.35	74LS640	1.09	.99
74LS158	.45	.35	74LS645	1.09	.99
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74S/PROMS*

74S00	.29	74S188*	1.29
74S04	.35	74S189	1.69
74S08	.35	74S196	2.49
74S10	.29	74S240	1.49
74S32	.35	74S244	1.49
74S74	.45	74S253	.79
74S85	1.79	74S287*	1.49
74S86	.35	74S288*	1.49
74S124	2.95	74S373	1.49
74S174	.79	74S374	1.49
74S175	.79	74S472*	2.95

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74ALS00	.35	74ALS138	.89
74ALS02	.35	74ALS174	.89
74ALS04	.39	74ALS175	.89
74ALS08	.39	74ALS240	1.49
74ALS10	.39	74ALS244	1.49
74ALS27	.39	74ALS245	1.49
74ALS30	.39	74ALS373	1.69
74ALS32	.39	74ALS374	1.69
74ALS74	.49	74ALS573	1.69

74F

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74F08	.39	74F193	3.95
74F10	.39	74F240	1.39
74F32	.39	74F244	1.39
74F74	.49	74F253	.99
74F86	.59	74F373	1.39
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CD4008	.89	CD4081	.25
CD4011	.19	CD4082	.25
CD4013	.29	CD4093	.35
CD4016	.29	CD4094	.89
CD4017	.55	CD40103	2.49
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CD4040	.65	CD4522	.79
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2732A-20	4096 x 8	(200ns) 21V	4.25
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27C32	4096 x 8	(450ns) 25V (CMOS)	6.49
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74HC30	.29	74HC259	.65
74HC32	.29	74HC273	.79
74HC74	.39	74HC373	.79
74HC75	.39	74HC374	.79
74HC76	.45	74HC393	.75
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74HC86	.39	74HC688	.79
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74HC125	.49	74HC4049	.59
74HC132	.49	74HC4050	.59
74HC138	.49	74HC4060	1.09
74HC139	.49	74HC4511	1.29
74HC154	1.19	74HC4514	1.19
74HC163	.65	74HC4538	.89
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74HCT08	.29	74HCT175	.69
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74C04	.29	74C221	1.49
74C08	.35	74C240	1.29
74C10	.35	74C244	1.29
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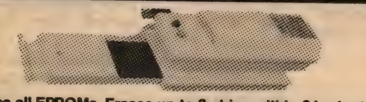

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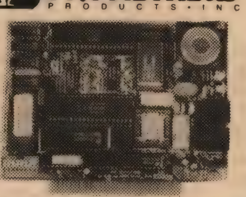

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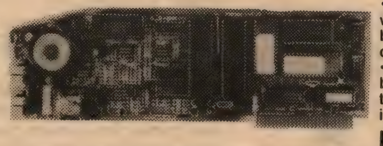

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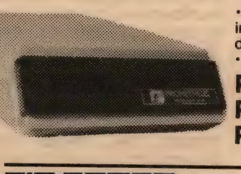

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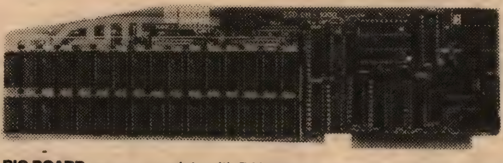

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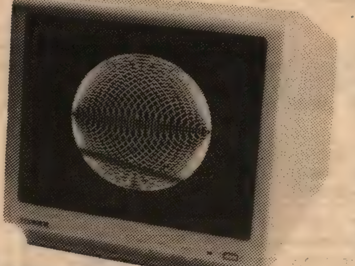

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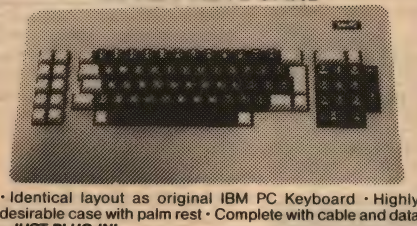

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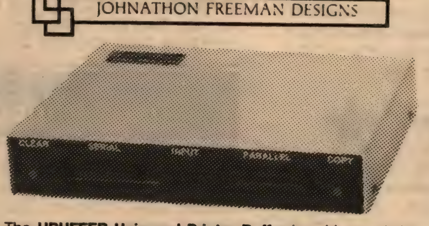

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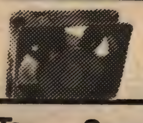

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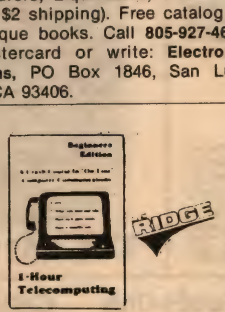

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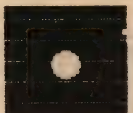

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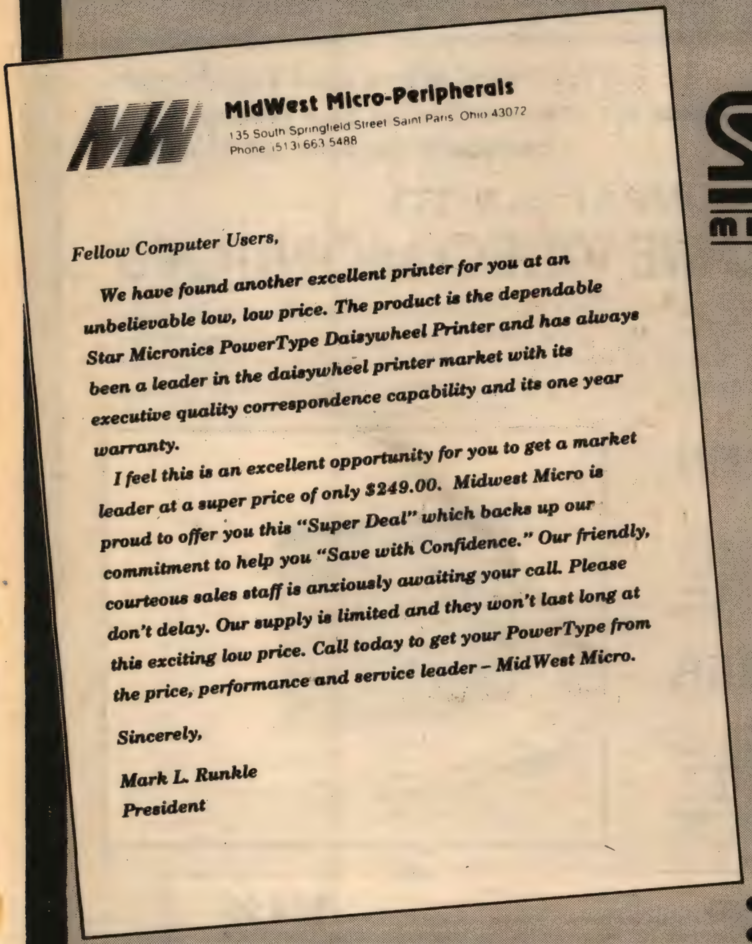

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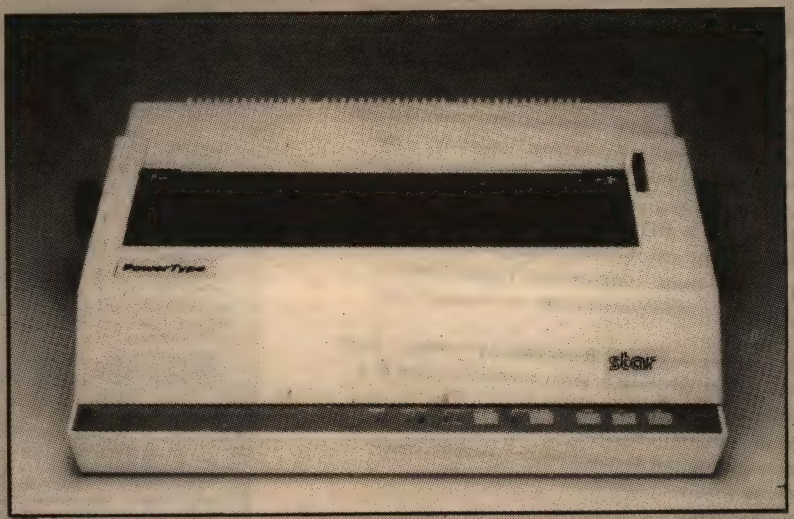

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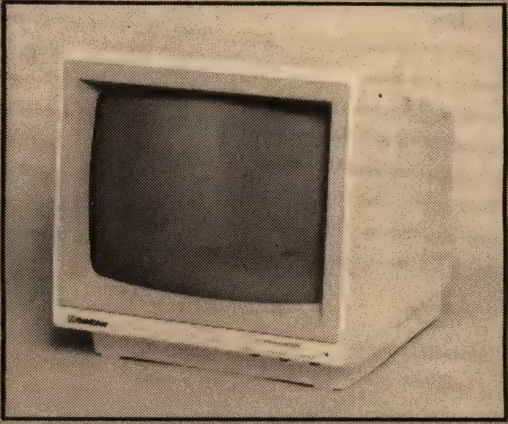

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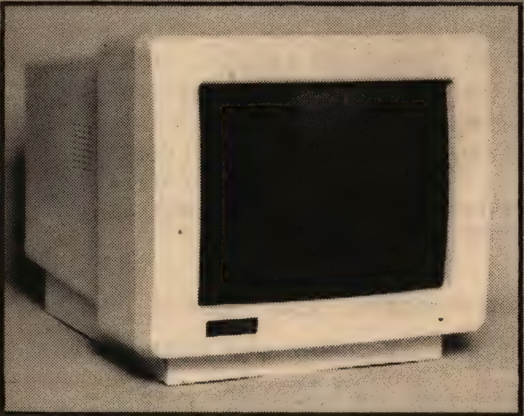

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IBM Corp.	Color	$680	13	0.43	15.75	60
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Thomson Products	CM36382Si	$529	14	0.38	15.70	60
Wyse Tech.	WY–620	$545	13.5	0.43	15.75	60
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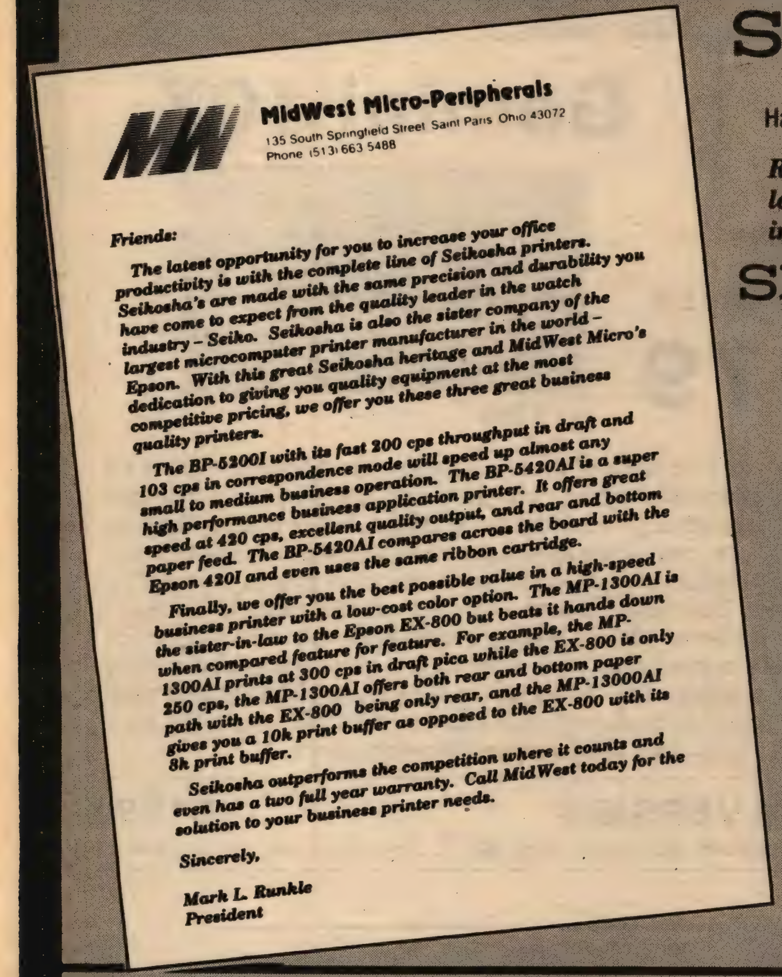

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Seikosha outperforms the competition where it counts and even has a two full year warranty. Call MidWest today for the solution to your business printer needs.

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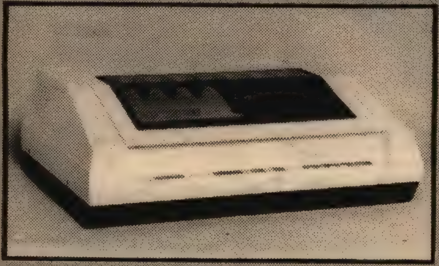

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Through special arrangements we have been authorized to offer you one of the most popular printers of all time at a "give away" price. Yes, we've sold thousands of the ever popular Gemini 10X printers at nearly twice the price. The 10X is a great choice for both business and home applications. Those already using our Star Gemini 10X's include about everyone from Bell Labs to my brother's kids.

I'm absolutely delighted to be able to offer you this durable and versatile printer for only $179. And you can expect the same friendly, courteous service both before and after the sale plus full warranty care from MidWest Micro.

Our supply is limited and they can't last long at this unbelievable price. So call today and get the buy of the year!

Sincerely
Mark L. Runkle
President
MidWest Micro

P.S. Thank you for voting our Gemini 10X the Best Buy of the Year in the impact printer category.

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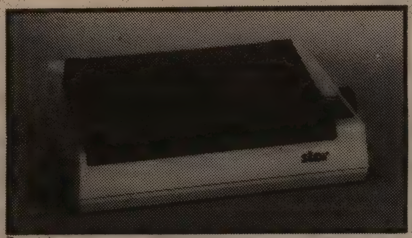
micronics • inc
Buy from the nations largest Direct Authorized Star Micronics Dealer and Service Center

COMPUTER SHOPPER
Best Buy
OF THE YEAR

MidWest Micro
Winner of Computer Shopper's Best Buy Award for Impact Printer

NOW you can get the most printer for your dollar with. . .

Gemini 10X



NOW ONLY
$179
LIST **$399**

If you are looking for a top quality printer at an affordable price, you've found both in the Gemini 10X. The Gemini 10X operates bi-directionally at 120 cps. It switches from standard 80 column printing to 132 column condensed and 96 standard ASCII characters. This gives you the capabilities to do everything from recipes to spreadsheets. The character matrix offered includes the descenders, emphasized, double strike, block graphics and hi and low bit image graphics. These features give the Gemini 10X versatility enough for use in your home or office. The Gemini 10X also features a buffer expandable to 8K that lets you continue to work – not waste your time waiting on your printer. Breakdowns? Virtually unheard of with the Gemini 10X – with a print head life of over 100 million crisp, clean characters. The Gemini 10X comes complete with both friction and adjustable tractor feed. It even includes a free roll paper feed mechanism for greater economy.

NEW **IBM VERSION** Just **$199**
of Gemini 10X with near letter quality mode, IBM PC compatibility, and special graphics.

Complete star Gemini 10X PRINTER PACKAGE

From MidWest Micro

JUST **$219**

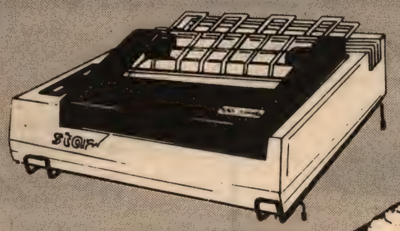
(Limited Time Offer)

Save $314

Printer Package Includes:

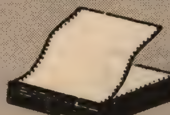
1. Full Featured **star Gemini 10X Printer**
2. A **Universal Printer Stand** which tilts printer toward you for easy access and creates space for organizing paper
3. Attractive Heavy-Duty vinyl **Printer Cover** – anti-static and anti-dust
4. Plenty Pack of 20# bond clean-edge fanfold **Paper**
5. 2 Super length **Ribbons** for Gemini 10X
6. Full **1 year Warranty** parts and labor
7. Free use of MidWest Micro's Customer **Support Hot Line** (513-663-4992)

Ribbons
$18 Value



Universal Printer Stand
$49 Value

Full Featured Gemini 10X Printer
$399 Value



Paper
$29 Value

Heavy-duty Vinyl Cover
$19 Value

Complete star Line. . .

The star printer line includes a number of fast, efficient and cost effective models. Call MidWest Micro and let us help you select one today!

	List	
SD-10 (160 cps, 80 Col, NLQ Mode)	$499	*289
SD-15 (160 cps, 132 Col, NLQ Mode)	599	*389
NX-15 (New, 120 cps, 132 Col, NLQ)		$CALL$
LV-1210 (120 cps, 80 Col, IBM Mode)	$299	$CALL$
SR-10 (200 cps, 80 Col, NLQ Mode)	$649	419
SR-15 (200 Cps, 132 Col, NLQ Mode)	799	499
POWERTYPE DAISYWHEEL	499	259

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Let us help you maximize your profits and minimize your inventory costs. Our exciting prices and delivery schedules will improve your bottom line. CALL 800-528-4504 In Ohio 800-222-6571

VISA MasterCard AMERICAN EXPRESS

For your protection we check thoroughly for stolen credit cards.

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135 S. Springfield St., Saint Paris, Ohio 43072

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brother M-1509 PRINTER

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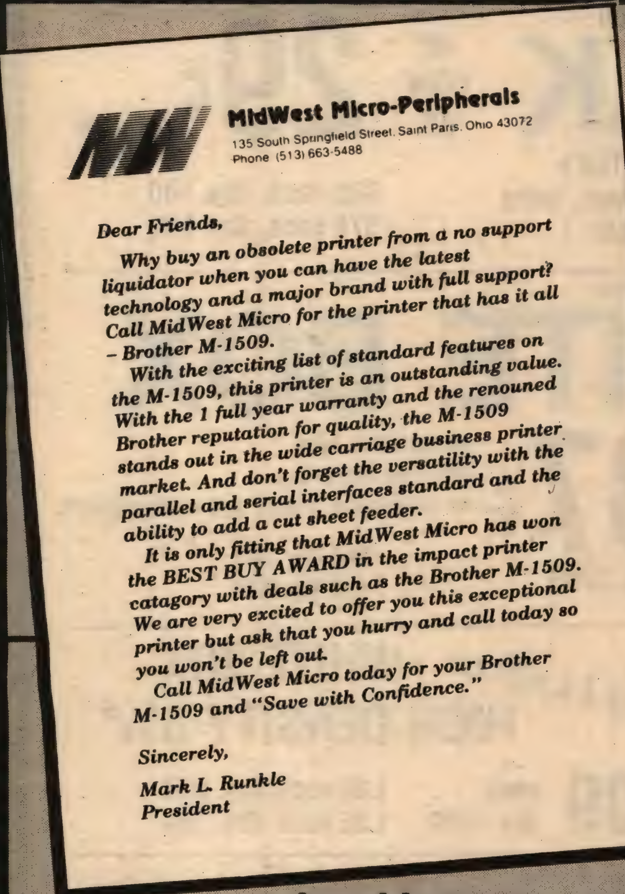
NO TAX CHARGED TO RESIDENTS OUTSIDE OHIO
SAME DAY SHIPPING ON ALL ITEMS IN STOCK
TECHNICAL SUPPORT

PRICE GUARANTEE
We at MidWest Micro guarantee that we can save you up to 69% or more on your purchase of new fully warranteed equipment and supplies. And we will still give you friendly, courteous service. Call today and Save With Confidence!

ONE CALL SHOPPING
TOLL FREE
DEALERS CALL
800-528-4504



MidWest Micro-Peripherals
135 South Springfield Street, Saint Paris, Ohio 43072
Phone (513) 663-5488

Dear Friends,

Why buy an obsolete printer from a no support liquidator when you can have the latest technology and a major brand with full support? Call MidWest Micro for the printer that has it all – Brother M-1509.

With the exciting list of standard features on the M-1509, this printer is an outstanding value. With the 1 full year warranty and the renouned Brother reputation for quality, the M-1509 stands out in the wide carriage business printer market. And don't forget the versatility with the parallel and serial interfaces standard and the ability to add a cut sheet feeder.

It is only fitting that MidWest Micro has won the BEST BUY AWARD in the impact printer catagory with deals such as the Brother M-1509. We are very excited to offer you this exceptional printer but ask that you hurry and call today so you won't be left out.

Call MidWest Micro today for your Brother M-1509 and "Save with Confidence."

Sincerely,

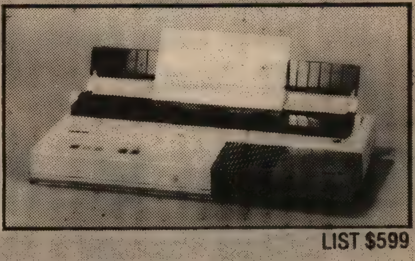
Mark L. Runkle
President

The Printer That Has It All . . .

brother M-1509

YOUR PRICE Too Low To Advertise**

Brother M-1509 Beats Epson FX-286 Hands Down



LIST $599

- Wide Carriage for up to 15.5" Paper Handling
- Fast 180 cps Print Speed
- Near Letter Quality Printing – 45 cps
- Full Graphics Capability
- Both Centronics Parallel and RS-232 Serial Interfaces
- Both IBM Graphics Printer & Epson FX Emulation
- Easy Access Control Panel
- Durable Construction
- 1 Full Year Warranty
- Large 3k Input Buffer with Optional 16k Upgrade
- Paper Saving Short Form Tear-Off
- Auto Paper Loading
- Quiet Operation (Below 58 db.)

brother M-1509

High Speed Printing
The M-1509 prints out your work at a rapid 180 cps, a speed generally offered only on much more expensive models. Logic-seeking bi-directional printing and a 3 Kbyte input buffer ensure that operation is fast and efficient.

Near Letter Quality Printing
A handsome NLQ character font is provided to handle all your business correspondence needs. One touch of the NLQ button is all it takes. And three other NLQ fonts can be optionally selected.

Graphics Capability
The M-1509 gives you a choice of seven high density bit image modes for graphics. Clean and attractive charts and graphs are printed out at a rapid pace.

Auto Paper Loading
Paper insertion is a simple, automatic operation controlled from the front panel. Paper will be fed to the correct position for printing to begin. The M-1509 can be used for data processing, as well, holding 16 - ½" width cut sheets or 16" width fanfold paper (136-column width).

IBM and Epson Compatibility
The M-1509 is equipped with character sets and control codes compatible with both the IBM PC® printer and the Epson FX-100 +®. This means easy interfacing with the wide range of personal computers that can be used with either of these two printers.

Quiet Operation
An important, but often overlooked, printer feature is the amount of noise it makes. In the case of the M-1509, this is very little – below 58 decibels – so it will never interfere with office routine.

One Inch Paper Cut
After printing stops, the push-up pin tractor feeds paper forward so that printing will begin again one inch after the paper perforation. Unlike many printers, the M-1509 does not feed forward – thereby wasting – the whole of the next page.

Ribbon Replacement
The ribbon will last for more than 2.5 million characters, but when it does need to be replaced, all you do is change cartridges – there's no need to touch the ribbon.

NLQ Font/Buffer Board (Optional)
The LQ-200 font board provides an extra choice of type styles and memory. It adds Analia PS and Gothic plus 16 Kbytes of RAM memory.

More brother Printer Savings

PRINTERS		Sugg. Retail	Your Price
HR-15XL	Parallel or Serial, 17 cps	$599	**$299**
HR-20	Parallel & Serial, 22 cps	499	**349**
HR-35	Parallel or Serial, 36 cps	995	**749**
Twinriter 5	Daisy (36 cps) & Dot (140 cps)	1295	**CALL**
M-1509	180 cps, Parallel & Serial, NLQ	599	**CALL**
PRINTER ACCESSORIES			
TF-50	HR-15XL Tractor Feed	$139	**$ 99**
TF-100	HR-25/35 Tractor Feed (Also Fits Datasouth DW-36 & Comrex CR-4)	149	**119**
TF-300	Twinriter 5 Tractor Feed	149	**129**
CF-50	HR-15XL Cut Sheet Feeder	259	**199**
CF-100	HR-25/35 Cut Sheet Feeder	269	**189**
CF-300	Twinriter 5 Cut Sheet Feeder	299	**259**
SF-40	M-1509 Cut Sheet Feeder	149	**129**
KB-50	HR-15XL Typewriter Keyboard	199	**169**
IF-232	Twinriter 5 Serial Port	59	**49**
LQ-200	M-1509 Font & Buffer Board	99	**79**
Wheel	HR-10/15XL/25/35 Cassette Printwheel	25	**23**

PRINTER RIBBONS

Brother Cartridge Ribbons Low as **$2.79** each
(Multistrike Film, One-Time Film, Nylon Fabric, Correctable Film, Red Tape, Correction Tape, Twinriter 5 Multistrike & Fabric)

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**Special Note

As you know, whenever possible MidWest Micro publishes unbelievably low prices. However, on this model your savings are so great that our publishing the price might interfere with other marketing channels. Please call today. I guarantee you will be delighted.

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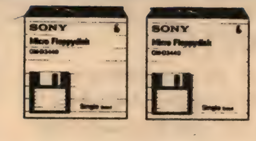
ONE

DISKETTES

SONY®



Boxed in tens

	50+	100+
3½″ Single Sided	1.22	1.17
3½″ Double Sided	1.85	1.79
5¼″ Double Sided/ Double Density	.99	.95
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SONY® MAC•PAC

3½″ SS Disks, Packaged in fifties

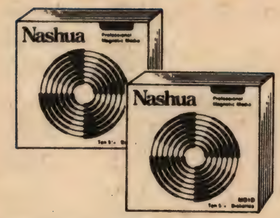
50+	100+	400+
1.19	1.15	1.09

3½″ DS Disks, Packaged in fifties

50+	100+	400+
1.63	1.58	1.53

Nashua™

- Boxed in tens
- Envelopes, write protects and labels
- 100% certified



	50+	100+
3½″ SS	1.17	1.09
3½″ DS	1.59	1.49
5¼″ SS/DD	—	.57
5¼″ DS/DD	—	.59
5¼″ HD	1.65	1.59

- Packaged in poly-bags of 50, sold in increments of 250.
- Labels, write protects and envelopes.

5¼″ SS/DD **39¢** EACH QTY. 500
41¢ EACH, QTY. 250

5¼″ DS/DD **41¢** EACH QTY. 500
45¢ EACH, QTY. 250

MEMOREX

5¼″ DS/DD, Boxed in tens

79¢ each Qty. 300

85¢ each, Qty. 100

VERIFLEX 5¼″ DISKS

Certified 100% ERROR FREE

5¼″ DS/DD

BULK

AS LOW AS **29¢** Qty. 1000

- Packaged in 100's
- Tyvek envelopes, write protects, labels

33¢ each, Qty. 500
37¢ each, Qty. 300

5¼″ DS/DD

WHITE BOX

AS LOW AS **37¢** Qty. 1000

- Boxed in tens
- Plain white box
- Envelopes, labels and write protects

39¢, Qty. 500
41¢, Qty. 100

NEW

VERIFLEX WHITE BOX HIGH DENSITY 5¼″

1.09 each Qty. 1000

1.25 each, Qty. 500
1.35 each, Qty. 100

5¼″ DS/DD

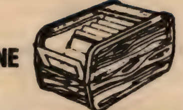
PLASTIC CASE

FREE CASE

- Boxed in tens
- Tyvek envelopes labels, write protects

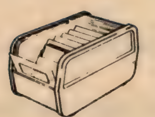
50+	100+
67¢	62¢

ROLLTOPS / FLIPSORTS



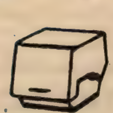
GENUINE TEAK

Holds 50
3½″ $17.49
Holds 50
5¼″ $24.99
Holds 100
5¼″ $32.99



CLASSIC DESIGN IN BUFF'N OAK

3½″ $17.49
5¼″ $24.99



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Holds 60
3½″ disks $5.95
Holds 80
5¼″ disks $5.95

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EPSON PRINTERS

SPECIAL OFFER

Free Software package with *Every* Epson printer you buy from this ad!!

BPS GRAPHICS

- Transform data into powerful graphics
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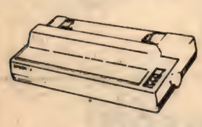
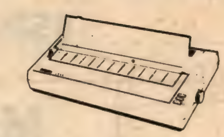
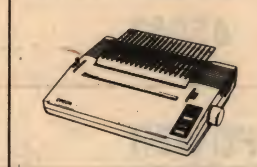
FX-286 $488



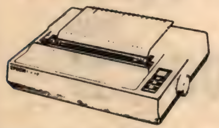
LQ-1000 $688



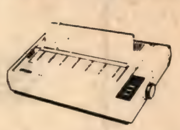
LX-86 $213



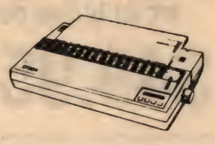
FX-85 $335



LQ-800 $488



LQ-2500 $973



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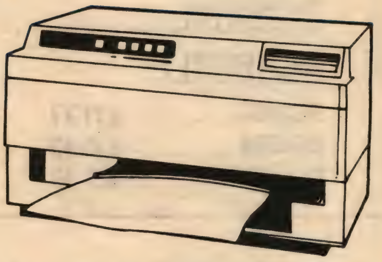
- Prints 8 pages per minute
- Automatic cassette or manual feed
- 15 font capability per page
- 8 bit parallel interface



$1935

Toner cartridges	$ 97.90
Font cartridges from	$189.00

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Others available — please call!

Prestige Elite	$184.99
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Apple Imagewriters	$2.35
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(contains one each: red, green, blue, brown, purple, yellow)

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182/192	$3.89
84/94	$2.00
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DMP2100	$3.25
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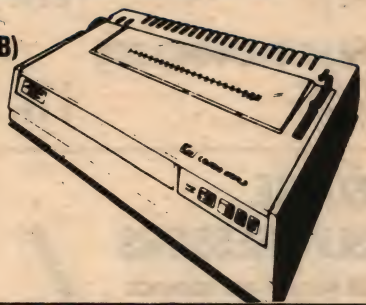
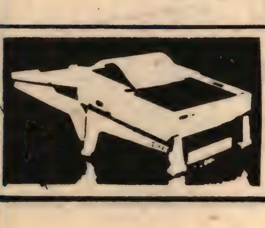
We pay the shipping . . . on the ADEUS CP2000

- Memory of 2KB (Expandable to 6KB)
- Fast and quiet (22 CPS at 58dB)
- Diablo 630 WP Sequence
- Parallel and serial ports
- Sheet and tractor feed available



$249



CURTIS PRINTER STAND

Held at a slight pitch to improve line of sight, this stand also reduces neck and eye strain

$17.99

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DC615HC	$17.17
DC1000	$12.17
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20 meg cassettes for Genoa and Memtec tape back-up systems

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- Base rotates 360°, platform swivels 180°
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American Power Conversion
Uninterruptable Power Supply

Protect your system against EMI, RFI, blackouts, brownouts!!

- 2 to 3 ms transfer time
- Prevents surges, spikes, noise, interference
- Compact design for use with desktop PC's.

330XT	$389.00
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SOFTWARE CLOSEOUT!!

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BPS Graphics	$14.99
Peachtext 5000	$49.00
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Quantities limited!

COPY II PC OPTION BOARD

By: Central Point Software
The best way to make archival back-ups of protected software!

$83.00

- Add-in board
- Gives you same capabilities as most disk duplication firms
- Includes track editor
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- FCC approved
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- Upfront, individual switching for up to five devices

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For IBM and compatibles

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Contains: Head Cleaning Kit
Swabs Antistatic Spray
Wipes Screen Terminal Cleaner

For 3½″	$12.95
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HEAD CLEANING KITS

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Serial/Parallel

Order Today!

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- Normal and common mode suppression
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by: Microcomputer Accessories

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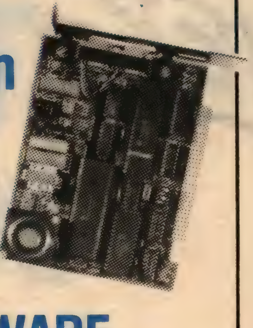
Short Card ½ Card Modem

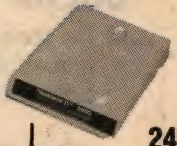


- 100% Hayes compatible
- True short slot modem
- Five year warranty ■ Easy to install
- Single keystroke commands throughout
- 18 number dialing table
- Auto-dial to Dow Jones and the Source

WITH QUICKLINK SOFTWARE

1200/300 BPS	2400/1200/300 BPS
$105.00	$219.00

"desktalk" External MODEM



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2400/1200/300 BPS . . $329.00

SMARTEAM

External modem
300/1200 BPS
With Quicklink Software
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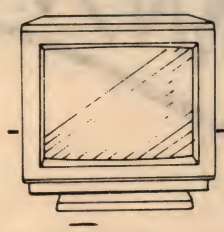
SAMSUNG MONITORS



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AMBER TTL

- 12" monochrome TTL
- With tilt'n swivel
- Amber Monitor
- High resolution

RGB, COLOR **$249.00**

- 14" screen
- 16" color display
- Interface cable
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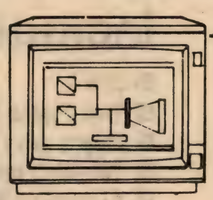

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- Dot Pitch .31mm
- 16/64 colors

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- Supports 256K
- Parallel printer port
- 1 year warranty
- 14" EGA monitor

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SAT. - 10 TO 3
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BUY BOTH $699!

20 MB HARD DISK SYSTEM

INCLUDES HARD DISK CONTROLLER, CABLES AND INSTRUCTIONS. ALL DRIVES ARE PRE-TESTED AND COME WITH A 1 YEAR WARRANTY.

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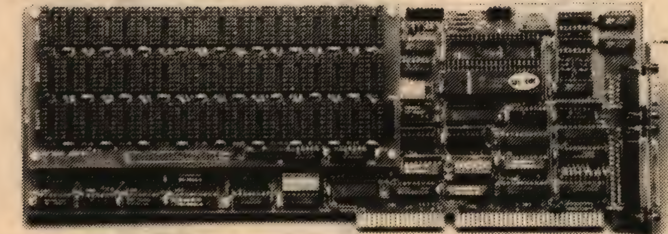

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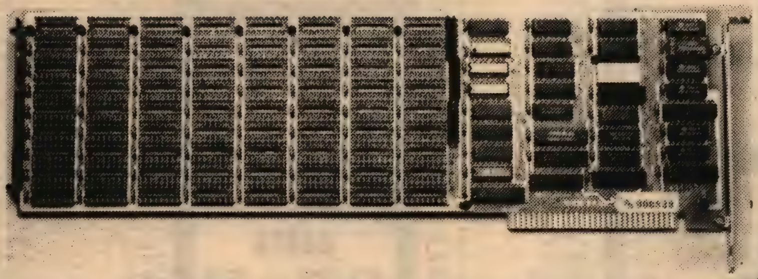

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- ⋆ USES 64K OR 256K DYNAMIC RAMS
- ⋆ USE AS EXPANDED (EMS) OR CONVENTIONAL MEMORY, RAMDISK OR SPOOLER
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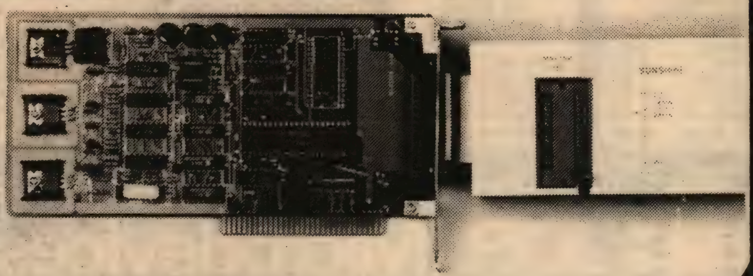
FOR IBM PC/XT/AT AND COMPATIBLES



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2112	256x4	(450ns)	2.99
2114	1024x4	(450ns)	.99
2114L-4	1024x4	(450ns)(LP)	1.09
2114L-2	1024x4	(200ns)(LP)	1.49
2114L-15	1024x4	(150ns)(LP)	1.95
TMS4044-4	4096x1	(450ns)	1.95
TMM2016-150	2048x8	(150ns)	1.49
TMM2016-100	2048x8	(100ns)	1.95
HM6116-4	2048x8	(200ns)(CMOS)	1.89
HM6116-3	2048x8	(150ns)(CMOS)	1.95
HM6116LP-4	2048x8	(200ns)(CMOS)(LP)	1.95
HM6116LP-3	2048x8	(150ns)(CMOS)(LP)	2.05
HM6116LP-2	2048x8	(120ns)(CMOS)(LP)	2.95
HM6264P-15	8192x8	(150ns)(CMOS)	3.89
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LP=Low power

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4116-250	16384x1	(250ns)	.49
4116-200	16384x1	(200ns)	.89
4116-150	16384x1	(150ns)	.99
4116-120	16384x1	(120ns)	1.49
MK4332	32768x1	(200ns)	6.95
4164-200	65536x1	(200ns)(5v)	1.19
4164-150	65536x1	(150ns)(5v)	1.29
4164-120	65536x1	(120ns)(5v)	1.95
MCM6665	65536x1	(200ns)(5v)	1.95
TMS4164	65536x1	(150ns)(5v)	1.95
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TMS4464-15	65536x4	(150ns)(5v)	6.95
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5v=Single 5 Volt Supply REFRESH=Pin 1 Refresh

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2732	4096x8	(450ns)(5V)	3.95
2732A	4096x8	(250ns)(5V)(21V PGM)	3.95
2732A-2	4096x8	(200ns)(5V)(21V PGM)	4.25
27C64	8192x8	(250ns)(5V)(CMOS)	5.95
2764	8192x8	(450ns)(5V)	3.49
2764-250	8192x8	(250ns)(5V)	3.95
2764-200	8192x8	(200ns)(5V)	4.25
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27128	16384x8	(250ns)(5V)	4.25
27C256	32768x8	(250ns)(5V)(CMOS)	10.95
27256	32768x8	(250ns)(5V)	7.49

5V=Single 5 Volt Supply 21V PGM=Program at 21 Volts

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Model	Timer	Capacity Chip	Intensity (uW/Cm²)	Unit Price
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PE-14T	YES	9	8,000	$119.00
PE-24T	YES	12	9,600	$175.00

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8035	1.49
8039	1.95
8080	2.95
8085	2.49
8087-2	169.95
8087	129.00
8088	6.95
8088-2	9.95
8155	2.49
8155-2	3.95
8748	7.95
8755	14.95
80286	129.95
80287	199.95

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8203	24.95
8205	3.29
8212	1.49
8216	1.49
8224	2.25
8237	4.95
8237-5	5.49
8250	6.55
8251	1.69
8251A	1.89
8253	1.89
8253-5	1.95
8255	1.69
8255-5	1.89
8259	1.95
8259-5	2.29
8272	4.95
8279	2.49
8279-5	2.95
8282	3.95
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8286	3.95
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Z80-CPU 2.5 MHz	1.69

4.0 MHz

Z80A-CPU	1.79
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1.0 MHz

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6520A	2.95
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6532A	11.95
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1.0 MHz

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6810	1.95
6820	2.95
6821	1.95
6840	6.95
6843	19.95
6844	12.95
6845	4.95
6847	11.95
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68B09	6.95
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2.5	4.95
4.0	4.95
5.0688	4.95
6.0	4.95
6.144	4.95
8.0	4.95
10.0	4.95
12.0	4.95
12.480	4.95
15.0	4.95
16.0	4.95
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20.0	4.95
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74LS02	.17	74LS169	.95
74LS03	.18	74LS173	.49
74LS04	.16	74LS174	.39
74LS05	.18	74LS175	.39
74LS08	.18	74LS191	.49
74LS09	.18	74LS192	.69
74LS10	.16	74LS193	.69
74LS11	.22	74LS194	.69
74LS12	.22	74LS195	.69
74LS13	.26	74LS196	.59
74LS14	.39	74LS197	.59
74LS15	.26	74LS221	.59
74LS20	.17	74LS240	.69
74LS21	.22	74LS241	.69
74LS22	.22	74LS242	.69
74LS27	.23	74LS243	.69
74LS28	.26	74LS244	.69
74LS30	.17	74LS245	.79
74LS32	.18	74LS251	.49
74LS33	.28	74LS253	.49
74LS37	.26	74LS256	1.79
74LS38	.26	74LS257	.39
74LS42	.39	74LS258	.49
74LS47	.75	74LS259	1.29
74LS48	.85	74LS260	.49
74LS51	.17	74LS266	.39
74LS73	.29	74LS273	.79
74LS74	.24	74LS279	.39
74LS75	.29	74LS280	1.98
74LS76	.29	74LS283	.59
74LS83	.49	74LS290	.89
74LS85	.49	74LS293	.89
74LS86	.22	74LS299	1.49
74LS90	.39	74LS322	3.95
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74LS93	.39	74LS364	1.95
74LS95	.49	74LS365	.39
74LS107	.34	74LS367	.39
74LS109	.36	74LS368	.39
74LS112	.29	74LS373	.79
74LS122	.45	74LS374	.79
74LS123	.49	74LS375	.95
74LS124	2.75	74LS377	.79
74LS125	.39	74LS378	1.18
74LS126	.39	74LS390	1.19
74LS132	.39	74LS393	.79
74LS133	.49	74LS541	1.49
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74LS153	.39	74LS684	3.20
74LS154	1.49	74LS688	2.40
74LS155	.59	74LS783	22.95
74LS156	.49	81LS95	1.49
74LS157	.35	81LS96	1.49
74LS158	.29	81LS97	1.49
74LS160	.29	81LS98	1.49
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74HC: Operate at CMOS logic levels and are ideal for new, all-CMOS designs.

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74HC10	.59	74HC158	.95
74HC14	.79	74HC163	1.15
74HC20	.59	74HC175	.99
74HC27	.59	74HC240	1.89
74HC30	.59	74HC244	1.89
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74HC51	.59	74HC257	.85
74HC74	.75	74HC259	1.39
74HC85	1.35	74HC273	1.89
74HC86	.69	74HC299	4.99
74HC93	1.19	74HC368	.99
74HC107	.79	74HC373	2.29
74HC109	.79	74HC374	2.29
74HC112	.79	74HC390	1.39
74HC125	1.19	74HC393	1.39
74HC132	1.19	74HC4017	1.99
74HC133	.69	74HC4020	1.39
74HC138	.99	74HC4049	.89
74HC139	.99	74HC4050	.89

74HCT00

74HCT: Direct, drop-in replacements for LS TTL and can be intermixed with 74LS in the same circuit.

74HCT00	.69	74HCT166	3.05
74HCT02	.69	74HCT174	1.09
74HCT04	.69	74HCT193	1.39
74HCT08	.69	74HCT194	1.19
74HCT10	.69	74HCT240	2.19
74HCT11	.69	74HCT241	2.19
74HCT27	.69	74HCT244	2.19
74HCT30	.69	74HCT245	2.19
74HCT32	.79	74HCT257	.99
74HCT74	.85	74HCT259	1.59
74HCT75	.95	74HCT273	2.09
74HCT138	1.15	74HCT367	1.09
74HCT139	1.15	74HCT373	2.49
74HCT154	2.99	74HCT374	2.49
74HCT157	.99	74HCT393	1.59
74HCT158	.99	74HCT4017	2.19
74HCT161	1.29	74HCT4040	1.59
74HCT164	1.39	74HCT4060	1.49

74F00

74F00	.69	74F74	.79	74F251	1.69
74F02	.69	74F86	.99	74F253	1.69
74F04	.79	74F138	1.69	74F257	1.69
74F08	.69	74F139	1.69	74F280	1.79
74F10	.69	74F157	1.69	74F283	3.95
74F32	.69	74F240	3.29	74F373	4.29
74F64	.89	74F244	3.29	74F374	4.29

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CMOS

4001	.19	14419	4.95
4011	.19	14433	14.95
4012	.25	4503	.49
4013	.35	4511	.69
4015	.29	4516	.79
4016	.29	4518	.85
4017	.49	4522	.79
4018	.69	4526	.79
4020	.59	4527	1.95
4021	.69	4528	.79
4024	.49	4529	2.95
4025	.25	4532	1.95
4027	.39	4538	.95
4028	.65	4541	1.29
4035	.69	4553	5.79
4040	.69	4585	.75
4041	.75	4702	12.95
4042	.59	74C00	.29
4043	.85	74C14	.59
4044	.69	74C74	.59
4045	1.98	74C83	1.95
4046	.69	74C85	1.49
4047	.69	74C95	.99
4049	.29	74C150	5.75
4050	.29	74C151	2.25
4051	.69	74C161	.99
4052	.69	74C163	.99
4053	.69	74C164	1.39
4056	2.19	74C192	1.49
4060	.69	74C193	1.49
4066	.29	74C221	2.49
4069	.19	74C240	1.89
4076	.59	74C244	1.89
4077	.29	74C374	1.99
4081	.22	74C905	10.95
4085	.79	74C911	8.95
4086	.89	74C917	12.95
4093	.49	74C922	4.49
4094	2.49	74C923	4.95
14411	9.95	74C926	7.95
14412	6.95	80C97	.95

7400/9000

7400	.19	74147	2.49
7402	.19	74148	1.20
7404	.19	74150	1.35
7406	.29	74151	.55
7407	.29	74153	.55
7408	.24	74154	1.49
7410	.19	74155	.75
7411	.25	74157	.55
7414	.49	74159	1.65
7416	.25	74161	.69
7417	.25	74163	.69
7420	.19	74164	.85
7423	.29	74165	.85
7430	.19	74166	1.00
7432	.29	74175	.89
7438	.29	74177	.75
7442	.49	74178	1.15
7445	.69	74181	2.25
7447	.89	74182	.75
7470	.35	74184	2.00
7473	.34	74191	1.15
7474	.33	74192	.79
7475	.45	74194	.85
7476	.35	74196	.79
7483	.50	74197	.75
7485	.59	74199	1.35
7486	.35	74221	1.35
7489	2.15	74246	1.35
7490	.39	74247	1.25
7492	.50	74248	1.85
7493	.35	74249	1.95
7495	.55	74251	.75
7497	2.75	74265	1.35
74100	2.29	74273	1.95
74121	.29	74278	3.11
74123	.49	74367	.65
74125	.45	74368	.65
74141	.65	9368	3.95
74143	5.95	9602	1.50
74144	2.95	9637	2.95
74145	.60	96S02	1.95

74S00

74S00	.29	74S163	1.29
74S02	.29	74S168	3.95
74S03	.29	74S174	.79
74S04	.29	74S175	.79
74S05	.29	74S188	1.95
74S08	.35	74S189	1.95
74S10	.29	74S195	1.49
74S15	.49	74S196	2.49
74S30	.29	74S197	2.95
74S32	.35	74S226	3.99
74S37	.69	74S240	1.49
74S38	.69	74S241	1.49
74S74	.49	74S244	1.49
74S85	.95	74S257	.79
74S86	.35	74S253	.79
74S112	.50	74S258	.95
74S124	2.75	74S280	1.95
74S138	.79	74S287	1.69
74S140	.55	74S288	1.69
74S151	.79	74S299	2.95
74S153	.79	74S373	1.69
74S157	.79	74S374	1.69
74S158	.95	74S471	4.95
74S161	1.29	74S571	2.95

VOLTAGE REGULATORS

TO-220 CASE

7805T	.49	7905T	.59
7808T	.49	7908T	.59
7812T	.49	7912T	.59
7815T	.49	7915T	.59

TO-3 CASE

7805K	1.59	7905K	1.69
7812K	1.39	7912K	1.49

TO-93 CASE

78L05	.49	79L05	.69
78L12	.49	79L12	1.49

OTHER VOLTAGE REGS

LM323K	5V	3A	TO-3	4.79
LM328K	Adj.	5A	TO-3	3.95
78H05K	5V	5A	TO-3	7.95
78H12K	12V	5A	TO-3	8.95
78P05K	5V	10A	TO-3	14.95

LINEAR

TL066	.99	LM733	.98
TL071	.69	LM741	.29
TL072	1.09	LM747	.69
TL074	1.95	LM748	.59
TL081	.59	MC1330	1.69
TL082	.99	MC1350	1.19
TL084	1.49	MC1372	6.95
LM301	.34	LM1414	1.59
LM309K	1.25	LM1458	.49
LM311	.59	LM1488	.49
LM311H	.89	LM1489	.49
LM317K	3.49	LM1496	.85
LM317T	.95	LM1812	8.25
LM318	1.49	LM1889	1.95
LM319	1.25	ULN2003	.79
LM320	see7900	XR2206	3.95
LM322	1.95	XR2211	2.95
LM323K	4.79	XR2240	1.95
LM324	.49	MPQ2907	1.95
LM331	3.95	LM2917	1.95
LM334	1.19	CA3046	.89
LM335	1.79	CA3081	.99
LM336	1.75	CA3082	.99
LM337K	3.95	CA3086	.80
LM338K	6.95	CA3089	1.95
LM339	.59	CA3130E	.99
LM340	see7800	CA3146	1.29
LM350T	4.60	CA3160	1.19
LF353	.59	MC3470	1.95
LF356	.99	MC3480	8.95
LF357	.99	MC3487	2.95
LM358	.59	LM3900	.49
LM380	.89	LM3909	.98
LM383	1.95	LM3911	2.25
LM386	.89	LM3914	2.39
LM393	.45	MC4024	3.49
LM394H	5.95	MC4044	3.99
TL494	4.20	RC4136	1.25
TL497	3.25	RC4558	.69
NE555	.29	LM13600	1.49
NE556	.49	75107	1.49
NE558	1.29	75110	1.95
NE564	1.95	75150	1.95
LM565	.95	75154	1.95
LM566	1.49	75188	1.25
LM567	.79	75189	1.25
NE570	2.95	75451	.39
NE590	2.50	75452	.39
NE592	.98	75453	.39
LM710	.75	75477	1.29
LM723	.49	75492	.79

H=TO-5 CAN, K=TO-3, T=TO-220

DATA ACQ INTERFACE

ADC0800	15.55	8T26	1.29
ADC0804	3.49	8T28	1.29
ADC0809	4.49	8T95	.89
ADC0816	14.95	8T96	.89
ADC0817	9.95	8T97	.59
ADC0831	8.95	8T98	.89
DAC0800	4.49	DM8131	2.95
DAC0806	1.95	DP8304	2.29
DAC0808	2.95	DS8833	2.25
DAC1020	8.25	DS8835	1.99
DAC1022	5.95	DS8836	.99
MC1408L8	2.95	DS8837	1.65

IC SOCKETS

	1-99	100+
8 PIN ST	.11	.10
14 PIN ST	.11	.09
16 PIN ST	.12	.10
18 PIN ST	.15	.13
20 PIN ST	.18	.15
22 PIN ST	.15	.12
24 PIN ST	.20	.15
28 PIN ST	.22	.16
40 PIN ST	.30	.22
64 PIN ST	1.95	1.49
ST=SOLDERTAIL		
8 PIN WW	.59	.69
14 PIN WW	.69	.52
16 PIN WW	.69	.58
18 PIN WW	.99	.90
20 PIN WW	1.09	.98
22 PIN WW	1.39	1.28
24 PIN WW	1.49	1.35
28 PIN WW	1.69	1.49
40 PIN WW	1.99	1.80
WW=WIREWRAP		
16 PIN ZIF	4.95	CALL
24 PIN ZIF	5.95	CALL
28 PIN ZIF	6.95	CALL
40 PIN ZIF	9.95	CALL

ZIF=TEXTOOL
(ZERO INSERTION FORCE)

EDGECARD CONNECTORS

100 PIN ST	S-100	.125	3.95
100 PIN WW	S-100	.125	4.95
62 PIN ST	IBM PC	.100	1.95
50 PIN ST	APPLE	.100	2.95
44 PIN ST	STD	.156	1.95
44 PIN WW	STD	.156	4.95

36 PIN CENTRONICS

	MALE	
IDCEN36	RIBBON CABLE	6.95
CEN36	SOLDER CUP	4.95
	FEMALE	
IDCEN36/F	RIBBON CABLE	7.95
CEN36PC	RT ANGLE PC MOUNT	4.95

INTERSIL

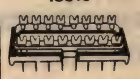
ICL7106	9.95
ICL7107	12.95
ICL7660	2.95
ICL8038	4.95
ICM7207A	5.95
ICM7208	15.95

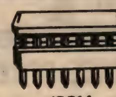
DIP CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS								
		8	14	16	18	20	22	24	28	40
HIGH RELIABILITY TOOLED ST IC SOCKETS	AUGATxxST	.62	.79	.89	1.09	1.29	1.39	1.49	1.69	2.49
HIGH RELIABILITY TOOLED WW IC SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIES (DIP HEADERS)	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	.95	.95	---	---	---	1.75	---	2.95

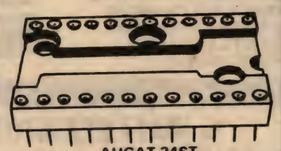
FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE BELOW

ICC16





IDP14



AUGAT 24ST

D-SUBMINIATURE

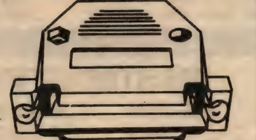
DESCRIPTION		ORDER BY	CONTACTS					
			9	15	19	25	37	50
SOLDER CUP	MALE	DBxxP	.82	.90	1.25	1.25	1.80	3.48
	FEMALE	DBxxS	.95	1.15	1.50	1.50	2.35	4.32
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	1.20	1.49	---	1.95	2.65	---
	FEMALE	DBxxSR	1.25	1.55	---	2.00	2.79	---
WIRE WRAP	MALE	DBxxPWW	1.69	2.56	---	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	---	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	2.70	2.95	---	3.98	5.70	---
	FEMALE	IDBxxS	2.92	3.20	---	4.33	6.76	---
HOODS	METAL	MHOODxx	1.25	1.25	1.30	1.30	---	---
	GREY	HOODxx	.65	.65	---	.65	.75	.95

ORDERING INSTRUCTIONS: INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED.

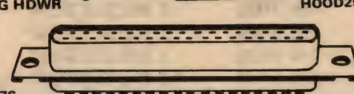
EXAMPLE: A 15 PIN RIGHT ANGLE MALE PC SOLDER WOULD BE DB15PR.

MOUNTING HARDWARE $1.00

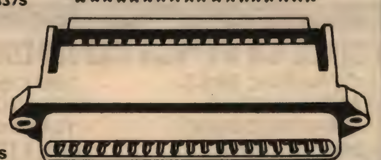
MTG HDWR



HOOD25



DB37S

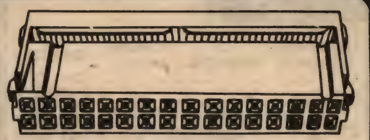


IDB37S

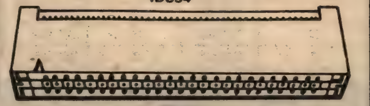
IDC CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS					
		10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.79	.99	1.39	1.59	1.99	2.25
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	1.75	2.25	2.65	2.75	3.80	3.95

FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE ABOVE



IDS34



IDE50

DIODES/OPTO/TRANSISTORS

1N751	.25	4N26	.69
1N759	.25	4N27	.69
1N4148	25/1.00	4N28	.69
1N4004	10/1.00	4N33	.89
1N5402	.25	4N37	1.19
KBP04	.55	MCT-2	.59
KBU8A	.95	MCT-6	1.29
MDA990-2	.35	TIL-111	.99
N2222	.25	2N3906	.10
PN2222	.10	2N4401	.25
2N2905	.50	2N4402	.25
2N2907	.25	2N4403	.25
2N3055	.79	2N6045	1.75
2N3904	.10	TIP31	.49

LED DISPLAYS

FND-357(359)		COM CATHODE	.362"	1.25
FND-500(503)		COM CATHODE	.5"	1.49
FND-507(510)		COM ANODE	.5"	1.49
MAN-72		COM ANODE	.3"	.99
MAN-74		COM CATHODE	.3"	.99
MAN-8940		COM CATHODE	.8"	1.99
TIL-313		COM CATHODE	.3"	.45
HP5082-7760		COM CATHODE	.43"	1.29
TIL-311	4x7	HEX W/LOGIC	.270"	9.95
HP5082-7340	4x7	HEX W/LOGIC	.290"	7.95

DIFFUSED LEDS

		1-99	100-UP
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.14	.12
JUMBO YELLOW	T1¾	.14	.12
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09

SWITCHES

SPDT	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39
SPST	MINI-PUSHBUTTON N.C.	.39
SPST	TOGGLE ON-OFF	.49
BCD OUTPUT 10 POSITION 6 PIN DIP		1.95

DIP SWITCHES

4 POSITION	.85	7 POSITION	.95
5 POSITION	.90	8 POSITION	.95
6 POSITION	.90	10 POSITION	1.29

RIBBON CABLE

CONTACTS	SINGLE COLOR		COLOR CODED	
	1'	10'	1'	10'
10	.18	1.60	.30	2.75
16	.28	2.50	.48	4.40
20	.36	3.20	.60	5.50
25	.45	4.00	.75	6.85
26	.46	4.10	.78	7.15
34	.61	5.40	1.07	9.35
40	.72	6.40	1.20	11.00
50	.89	7.50	1.50	13.25

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CAN BE SNAPPED APART TO MAKE ANY SIZE HEADER, ALL WITH .1" CENTERS

1x40	STRAIGHT LEAD	.99
1x40	RIGHT ANGLE	1.49
2x40	STRAIGHT LEAD	2.49
2x40	RIGHT ANGLE	2.99

SHORTING BLOCKS

GOLD CONTACTS SPACED AT .1" CENTERS

5/$1.00

Dear Mr. Rose:

I feel compelled to commend you and your people for the pleasant, polite, willingness to help and professional attitude you have displayed. In these times it is indeed refreshing to deal with a company whose staff consists of people of this caliber. My friends and associates will most certainly be doing business with you again.

Sincerely, Nicholas Chabra

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BARGAIN HUNTERS CORNER

20 MEG

FULL HEIGHT

HARD DISK DRIVE

INCLUDES CABLE & CONTROLLER CARD

$349⁹⁵

SPECIAL ENDS 12/31/86

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PRECUT ASSORTMENT

IN ASSORTED COLORS $27.50

100ea: 5.5", 6.0", 6.5", 7.0"
250ea: 2.5", 4.5", 5.0"
500ea: 3.0", 3.5", 4.0"

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100 feet	$4.30	250 feet	$7.25
500 feet	$13.25	1000 feet	$21.95

Please specify color:
Blue, Black, Yellow or Red

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- MANUFACTURED BY CORCOM
- LOW COST
- FITS LC-HP BELOW
- 6 AMP 120/240 VOLT

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LC-3	3 CONDUCTOR	.99
LC-HP	3 CONDUCTOR W/STD FEMALE SOCKET	1.49

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3.15" SQ	ROTRON	14.95
3.63" SQ	ETRI	14.95
3.18" SQ	MASUSHITA	16.95

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FR-4 EPOXY GLASS LAMINATE
WITH GOLD-PLATED EDGE-CARD FINGERS

JDR Microdevices

IBM-PR2

IBM

BOTH CARDS HAVE SILK SCREENED LEGENDS AND INCLUDES MOUNTING BRACKET

IBM-PR1	WITH +5V AND GROUND PLANE	$27.95
IBM-PR2	AS ABOVE WITH DECODING LAYOUT	$29.95

S-100

P100-1	BARE - NO FOIL PADS	$15.15
P100-2	HORIZONTAL BUS	$21.80
P100-3	VERTICAL BUS	$21.80
P100-4	SINGLE FOIL PADS PER HOLE	$22.75

APPLE

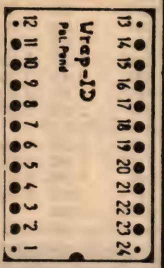
P500-1	BARE - NO FOIL PADS	$15.15
P500-3	HORIZONTAL BUS	$22.75
P500-4	SINGLE FOIL PADS PER HOLE	$21.80
7060-45	FOR APPLE IIe AUX SLOT	$30.00

SOCKET-WRAP I.D.™

- SLIPS OVER WIRE WRAP PINS
- IDENTIFIES PIN NUMBERS ON WRAP SIDE OF BOARD
- CAN WRITE ON PLASTIC; SUCH AS IC #

PINS	PART#	PCK. OF	PRICE
8	IDWRAP 08	10	1.95
14	IDWRAP 14	10	1.95
16	IDWRAP 16	10	1.95
18	IDWRAP 18	5	1.95
20	IDWRAP 20	5	1.95
22	IDWRAP 22	5	1.95
24	IDWRAP 24	5	1.95
28	IDWRAP 28	5	1.95
40	IDWRAP 40	5	1.95

PLEASE ORDER BY NUMBER OF PACKAGES (PCK. OF)



ID WRAP 24

FRAME STYLE TRANSFORMERS

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- FOR IBM PC-XT COMPATIBLE
- 135 WATTS
- +5V @ 15A, +12V @ 4.2A -5V @ .5A, -12V @ .5A
- ONE YEAR WARRANTY

PS-IBM

PS-IBM-150 $79.95

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- 150 WATTS
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- ONE YEAR WARRANTY

PS-130

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- 130 WATTS
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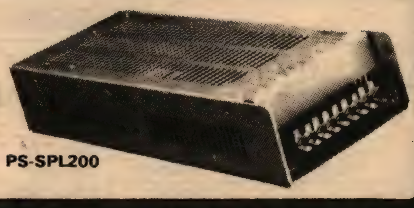
- +5V @ 7A, +12V @ 3A -5V @ .5A, -12V @ .5A
- APPLE POWER CONNECTOR

PS-SPL200 $49.95

- +5V @ 25A, +12V @ 3.5A -5V @ 1A, -12V @ 1A
- UL APPROVED
- ALUMINUM ENCLOSURE



PS-SPL200

CAPACITORS

TANTALUM

1.0µf	15V	.35	.47µf	35V	.45
6.8	15V	.70	1.0	35V	.45
10	15V	.80	2.2	35V	.65
22	15V	1.35	4.7	35V	.85
.22	35V	.40	10	35V	1.00

DISC

10pf	50V	.05	680	50V	.05
22	50V	.05	.001µf	50V	.05
27	50V	.05	.0022	50V	.05
33	50V	.05	.005	50V	.05
47	50V	.05	.01	50V	.07
68	50V	.05	.02	50V	.07
100	50V	.05	.05	50V	.07
220	50V	.05	.1	12V	.10
560	50V	.05	.1	50V	.12

MONOLITHIC

.01µf	50V	.14	.1µf	50V	.18
.047µf	50V	.15	.47µf	50V	.25

ELECTROLYTIC

RADIAL			AXIAL		
1µf	25V	.14	1µf	50V	.14
2.2	35V	.15	10	50V	.16
4.7	50V	.15	22	16V	.14
10	50V	.15	47	50V	.20
47	35V	.18	100	35V	.25
100	16V	.18	220	25V	.30
220	35V	.20	470	50V	.50
470	25V	.30	1000	16V	.60
2200	16V	.70	2200	16V	.70
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DIP	16 PIN	15 RESISTOR	1.09
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DIP	14 PIN	13 RESISTOR	.99

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WBU-208

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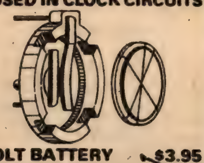

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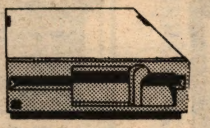
FOR APPLE COMPUTERS



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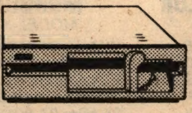

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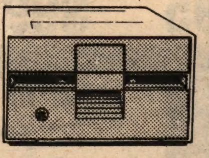

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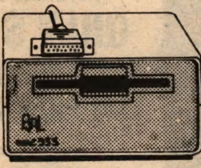

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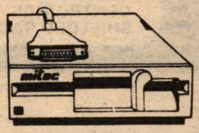

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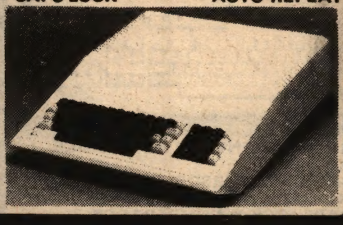

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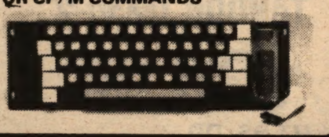

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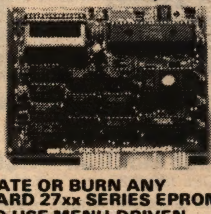

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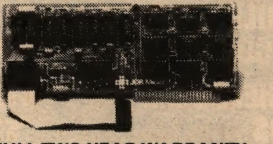

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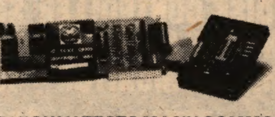

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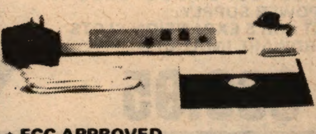

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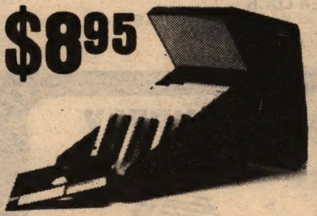

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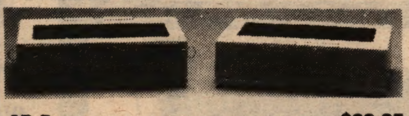

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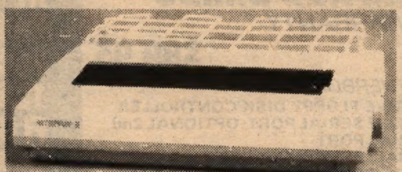

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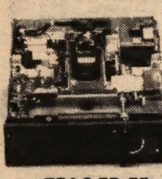

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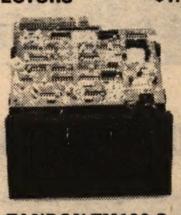

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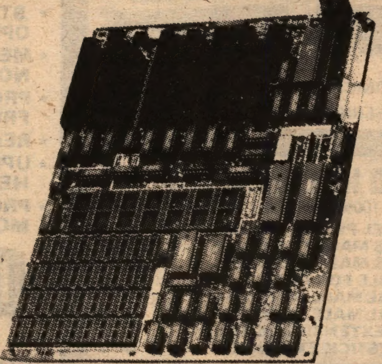

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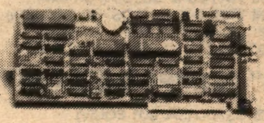

- 2 DRIVE FLOPPY DISK CONTROLLER
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- GAME PORT
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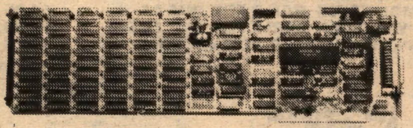

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- 0-384K RAM
- SERIAL PORT
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- SOFTWARE INCLUDED

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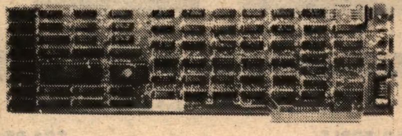

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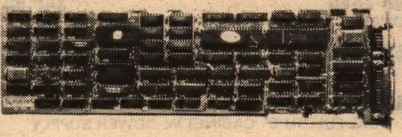

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- PARALLEL PRINTER INTERFACE

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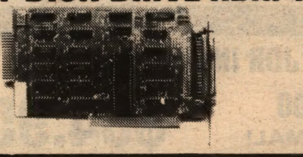

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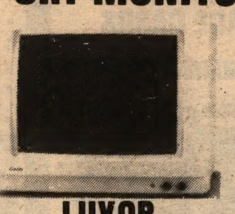

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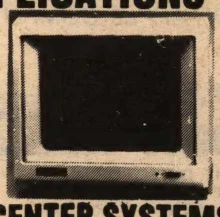

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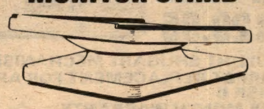

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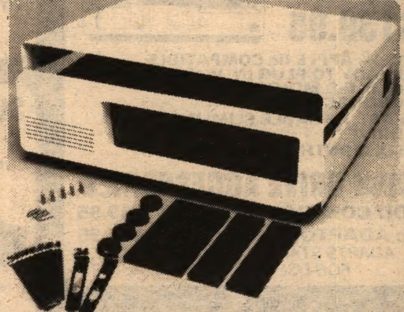

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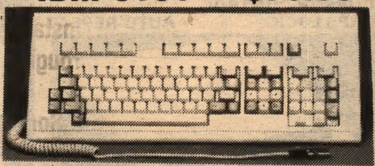

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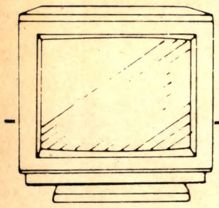

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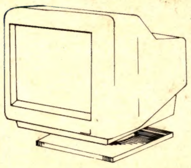

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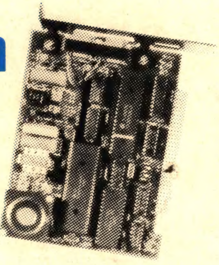

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